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Site Closure Report for Building 173 - Former Diesel UST Site

Robins Air Force Base
Warner Robins, Georgia

Prepared For

Air Force Center for Environmental Excellence
Brooks Air Force Base
San Antonio, Texas

and

Warner Robins Air Logistics Center
Robins Air Force Base
Warner Robins, Georgia

March 1998

AQM01-03-0544

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SITE CLOSURE REPORT
FOR
BUILDING 173 - FORMER DIESEL UST SITE
ROBINS AIR FORCE BASE, GEORGIA

Prepared for:

Air Force Center for Environmental Excellence
Brooks AFB, Texas
and

Warner Robins Air Logistics Center
Robins Air Force Base, Georgia

March 1998

Parsons Engineering Science, Inc.
5390 Triangle Parkway, Suite 100
Norcross, Georgia 30092

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SECTION 1
INTRODUCTION

1.1 SCOPE AND OBJECTIVES

Since 1992, Robins Air Force Base (AFB) has participated in the Air Force Bioventing Pilot Test Initiative project. Sponsored by the Air Force Center for Environmental Excellence (AFCEE) at Brooks AFB, Texas, the project has involved conducting more than 135 *in situ* bioventing pilot tests at 48 Air Force installations throughout the United States (US). These tests were designed to collect data on the effectiveness of bioventing for the remediation of soil contaminated with fuel hydrocarbons (e.g., JP-4 jet fuel, diesel fuel, gasoline, or heating oil).

As part of this project, a bioventing pilot test was conducted at Robins AFB Building 173, a former diesel underground storage tank (UST) site. The initial bioventing pilot testing effort was performed in August 1992, and a pilot-scale system was installed in September 1992 for continuous air injection into anaerobic, petroleum-impacted vadose zone soils. The pilot-scale system has operated continuously since then, providing treatment for the entire volume of petroleum-impacted soil at the site. This closure report for Building 173 has been prepared by Parsons Engineering Science, Inc. (Parsons ES) to support a "no further action required (NFAR) status" for vadose zone soils at Building 173. This recommendation is based on analytical results obtained through implementation of a site-specific closure sampling and analysis plan (SAP) (Parsons ES, 1996). A copy of the SAP is provided as Appendix A. The closure SAP presented a plan for confirmatory groundwater and soil sampling and analysis to document the effectiveness of soil remediation at the site and to demonstrate compliance with regulatory requirements for closure of the vadose zone soils. Building 173 is regulated under the Georgia Underground Storage Tank Act Rules (GUSTA Rules). Soil Threshold Levels (STLs), as defined in the GUSTA Rules, vary depending on the geographic location of a site within the State and the distance to the nearest groundwater withdrawal point or surface water body (GA EPD, 1995). Geographically, the Building 173 site is located within the Average or Higher Groundwater Pollution Susceptibility Area. A public water supply well, located approximately 120 feet northwest of the site, is the nearest groundwater withdrawal point. The applicable STLs specified by Table A of the GUSTA Rules are presented in Table 1.1. Groundwater quality standards for the site are the State and Federal Maximum Contaminant Levels (MCLs). The GUSTA Rules specify that benzene, toluene, ethylbenzene, and xylenes (BTEX) and polynuclear aromatic hydrocarbons (PAH) concentrations should not exceed the applicable MCL for

Table 1.1
Applicable Soil Threshold Levels[1]
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

Parameter	**Average or Higher Groundwater Pollution Susceptibility Area [2]**
	≤500 ft to withdrawal Point
Volatile Organic Compounds (mg/kg)[3]	
Benzene	0.005
Toluene	0.400
Ethylbenzene	0.370
Xylenes (total)	20.00
Polynuclear Aromatic Hydrocarbons (mg/kg)	
Acenaphthene	NA[4]
Anthracene	NA
Benz(a)anthracene	NA
Benzo(a)pyrene	0.660
Benzo(b)fluoranthene	0.820
Benzo(g,h,i)perylene	NA
Benzo(k)fluoranthene	1.60
Chrysene	0.660
Dibenz(a,h)anthracene	1.50
Fluoranthene	NA
Fluorene	NA
Indeno(1,2,3-c,d)pyrene	0.660
Naphthalene	NA
Phenanthrene	NA
Pyrene	NA

(1) - As specifed in Table A of GUST Rule 391-3-15-.09.
(2) - Where public water supplies exist within 2.0 miles and/or non-public supplies exist within 0.5 miles. Based on an assumed distance of 0.5 feet between contaminated soils and the water table.
(3) - mg/kg - milligrams per kilogram.
(4) - NA - not applicable. The health-based threshold level exceeds the expected soil concentration under free product conditions.

sites located within 500 feet of a public water supply withdrawal point. The State and Federal MCLs for groundwater are presented in Table 1.2.

Confirmation soil and groundwater sampling was conducted after approximately 4 years of bioventing system operation. Confirmation sampling activities consisted of advancing seven boreholes to depths ranging from 37 to 46 feet below ground surface (bgs), and analyzing selected soil and groundwater samples for hydrocarbon constituents to support site closure. A total of sixteen soil samples and two groundwater samples, including quality control (QC) samples, were submitted for analysis from the seven boreholes. Except for two samples, all analytical results for vadose zone soil samples were below the applicable STLs for BTEX and PAHs. Ethylbenzene was detected in one samples at a concentration less than three times the applicable STL and several PAH compounds were detected in a second sample at concentrations less than twice the applicable STLs. Based on these results, site remediation activities have been effective across the site, however, limited quantities of BTEX and PAH compounds exist within the vadose zone at the site. Analytical results for groundwater samples were below the State and Federal MCLs for BTEX and PAHs. Through the calculation of site-specific Alternate Threshold Levels (ATLs) for vadose zone soils that are based on site-specific concentration and hydrogeologic data, no further action is required to treat vadose zone soils at the subject site.

1.2 REPORT ORGANIZATION

This site closure report consists of five sections, including this introduction, and five appendices. Section 2 includes a site description, history, and summary of previous investigations and remediation activities. Section 3 is a description of closure soil sampling activities that were conducted at the site. Section 4 contains a summary of closure sampling analytical results and a recommendation for site closure. References used in preparation of this study are provided in Section 5. Appendix A presents a copy of the closure SAP for the Building 173 UST Site. Appendix B provides copies of site borehole logs. Appendix C presents laboratory analytical data for site environmental and quality assurance (QA) samples. Appendix D presents the ATL calculations for the vadose zone soils at the site.

Table 1.2
State and Federal Maximum Contaminant Levels
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

Parameter	State Maximum Contaminant Level(1) (mg/L)(3)	Federal Maximum Contaminant Level(2) (mg/L)
Volatile Organic Compounds		
Benzene	0.005	0.005
Toluene	1.0	1
Ethylbenzene	0.7	0.7
Xylenes (total)	10.0	10
Polynuclear Aromatic Hydrocarbons		
Acenaphthene	NA(4)	NA
Anthracene	NA	NA
Benz(a)anthracene	NA	NA
Benzo(a)pyrene	0.0002	0.0002
Benzo(b)fluoranthene	NA	NA
Benzo(g,h,i)perylene	NA	NA
Benzo(k)fluoranthene	NA	NA
Chrysene	NA	NA
Dibenz(a,h)anthracene	NA	NA
Fluoranthene	NA	NA
Fluorene	NA	NA
Indeno(1,2,3-c,d)pyrene	NA	NA
Naphthalene	NA	NA
Phenanthrene	NA	NA
Pyrene	NA	NA

(1) - GA EPD, 1994. Rules for Safe Drinking Water, Chapter 391-3-5-.18, March.
(2) - USEPA, 1995. Drinking Water Regulations and Health Advisories. May.
(3) - mg/L - milligrams per liter.
(4) - NA - not applicable. No MCL has been established.

SECTION 2
SITE DESCRIPTION AND HISTORY

Robins AFB is located in central Georgia approximately 18 miles south of Macon, adjacent to the town of Warner Robins. The boundaries of the Base encompass approximately 8,800 acres with facilities for operation, industrial, administrative, supply, and residential functions. A Base site plan is shown on Figure 2.1.

The primary missions of Robins AFB are the responsibilities assigned to the Warner Robins Air Logistics Center (WR-ALC), which has a three-fold mission as follows.

- *It is the worldwide logistics manager for assigned aircraft and commodities.* The WR-ALC is logistics manager for two Air Force transport aircraft (C-141 and C-130) and the F-15 fighter. In addition, electronics equipment managed at WR-ALC ties its support to every element of the aerospace combat force including seven missiles, four helicopters, two utility aircraft, and four drones and remotely piloted vehicles. In addition, Robins AFB is home for the Joint STARS and a B-1B Bomber Wing.

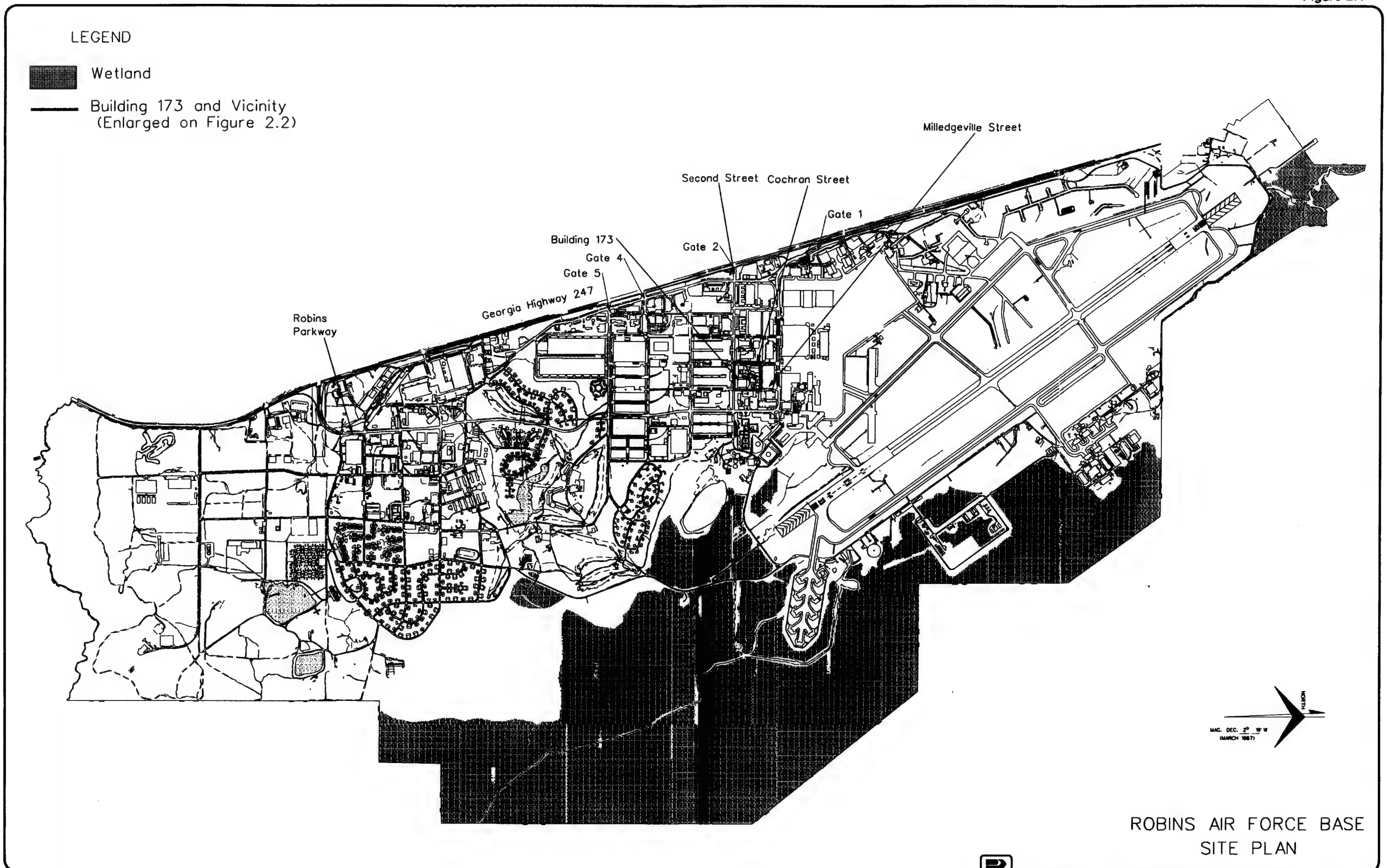
- *It is the repair center for aircraft and five distinct technologies.* WR-ALC is a major technology repair center for airborne electronics for the Air Force. In addition, aircraft repair and maintenance responsibilities for the F-15, C-141, and C-130 are assigned to WR-ALC. WR-ALC has various shops (plating, machining, metal bonding, painting, etc.) that support the major workload activities.

- *It serves as a storage center at wholesale and retail levels for Air Force spare parts and systems.* The third major mission involves receiving, storing, issuing, and transporting material. These functions are carried out in an automated warehouse on Base. Together with its worldwide mission, WR-ALC has responsibility for logistics support of Air Force installations in the geographical area including the eastern United States, Newfoundland, Greenland, Iceland, Bermuda, the Azores, and activities in Europe and the Middle East.

2.1 BUILDING 173 FORMER DIESEL UST SITE

Building 173 is located north of Second Street, east of Cochran Street, and west of Milledgeville Street (Figure 2.2). The area immediately surrounding the building is grass with an asphalt parking lot to the west and Milledgeville Street to the east. The former

Figure 2.1



ROBINS AIR FORCE BASE
SITE PLAN

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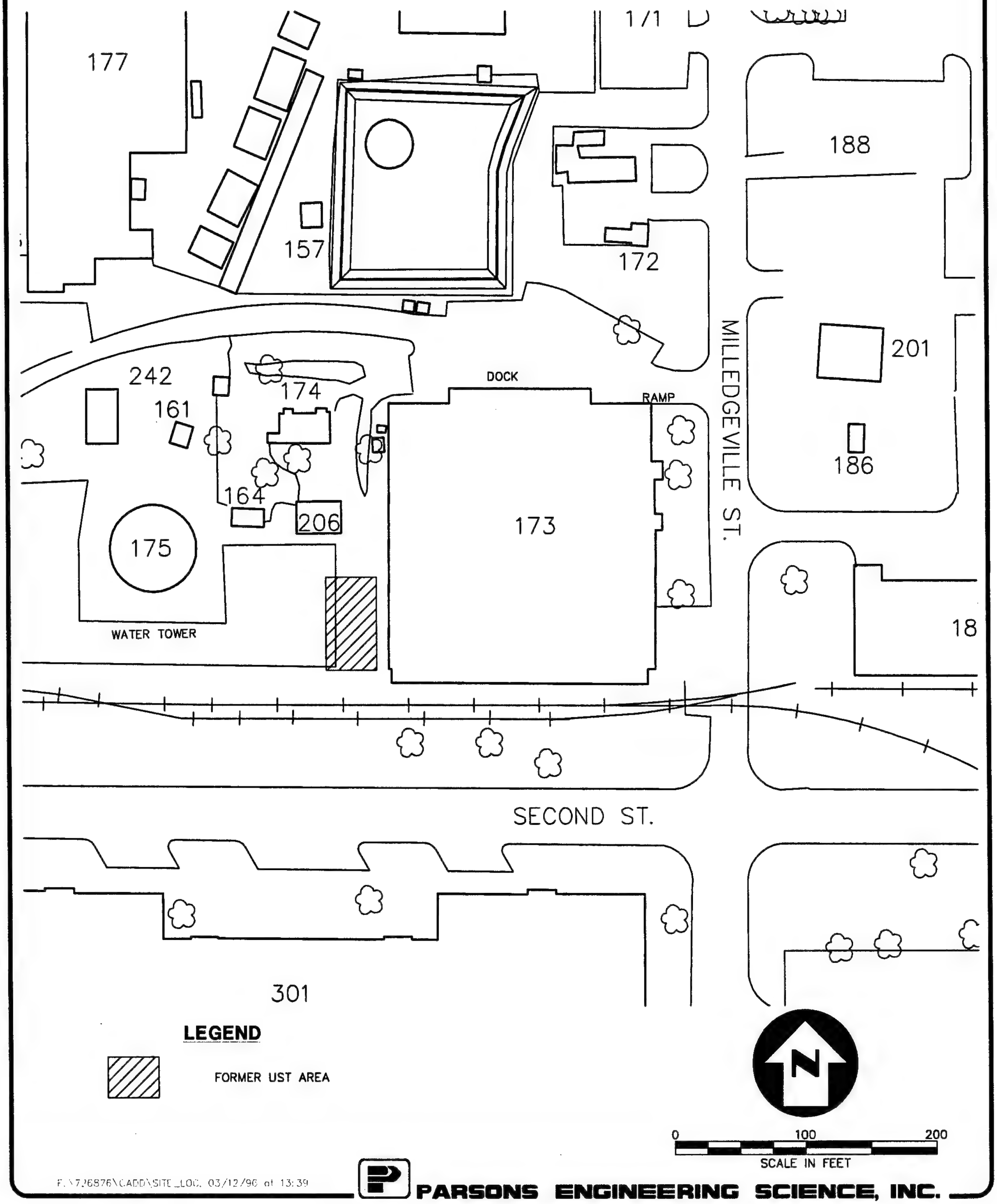
SITE LOCATION MAP
BUILDING 173 - FORMER DIESEL UST SITE
ROBINS AFB, GEORGIA



1,500-gallon UST contained diesel fuel for use in emergency power generators. The UST was located on the west side of Building 173, in the area just north of an existing gazebo. The UST was abandoned in place approximately 22 years ago and was excavated and removed in October 1989. Analysis of soil samples collected from the excavation indicated the presence of petroleum hydrocarbon constituents.

2.2 SITE GEOLOGY

Subsurface soils at Building 173 consist primarily of sand and clay with varying amounts of silt and gravel. Soils encountered from ground surface to approximately 25 feet bgs consisted of varying layers of clay, sand, clay and sand, sand and silt, and sand with little to some gravel (see Figure 3.2). A dense clay layer varying in thickness from 2 to 9 feet was encountered at 24 to 25 feet bgs in each boring. Below this clay layer, a clay and silt layer varying in thickness from less than 1 to 6 feet was encountered. Typically, this clay and silt layer thickens as the clay layer above becomes thinner. Below the clay and silt layer, soils consisted primarily of sand with varying amounts of silt and clay. In two borings, clay (approximately 2 feet thick) was encountered within the lower sand unit at depths of 36 to 39 feet bgs. Boring logs are presented in Appendix B.

2.3 SITE HYDROGEOLOGY

No monitoring wells were installed during the confirmation sampling activities conducted at the site. Soil borings advanced during sampling activities encountered groundwater at depths ranging from 38 to 44 feet bgs. Boring logs from the installation of monitoring wells in the vicinity of Building 173 in December 1986 and January 1987 indicate that saturated soils were encountered at depths ranging from 27 to 40 feet bgs. The static water level in these wells in April 1987 ranged from approximately 27 to 31 feet below ground surface.

In July 1995, groundwater samples were collected at the site using a Geoprobe® environmental sampling rig. Groundwater level readings taken in the temporary Geoprobe® sampling locations and in existing wells in the area indicated a groundwater flow direction to the east-northeast.

2.3 PREVIOUS INVESTIGATIONS

2.3.1 UST Removal: 1989

The 1,500-gallon diesel UST at Building 173 was discovered in September 1989, and excavated and removed in October 1989. Upon discovery, the tank was full of water with a small amount of light non-aqueous phase liquid (LNAPL) floating on the water (WR-ALC, 1990). At least one soil sample was collected during the tank removal effort. Analysis of this sample indicated the presence of hydrocarbons at a concentration over 12,000 milligrams per kilogram (mg/kg) as total petroleum hydrocarbons (TPH) (WR-ALC, 1989).

2.3.2 Site Characterization Investigation: 1990

A site characterization investigation was initiated in January 1990 to confirm the presence of hydrocarbons in the subsurface soils at the site. Nine soil borings were advanced to depths of 25 feet bgs in the area of the former UST at Building 173 (Figure 2.3). Soil samples were collected from seven of the nine borings and were analyzed for BTEX. Four samples were collected from boring B173-1, located through the center of the former tank pit. Samples were collected at 5-foot intervals beginning at 8.5 feet bgs. Samples were collected from six of the eight remaining borings (one sample per boring) at depths ranging from 8.5 to 15 feet bgs.

The cleanup level of 20 mg/kg for BTEX (as specified in the Georgia UST regulations in force during the investigation) was exceeded in one sample submitted for analysis. This sample (173-B1-2) was collected from boring B173-1 at a depth of 8.5 to 10 feet bgs. Xylenes were present in the sample at a concentration of 89.42 mg/kg. Benzene, toluene, and ethylbenzene concentrations in sample 173-B1-2 were below detection limits. Soil boring sample results are summarized in Table 2.1.

2.3.3 Re-Excavation and Backfill: 1992

Re-excavation of the tank pit and surrounding soil was performed at the site in March 1992 to remove hydrocarbon-impacted soils from the site. During excavation activities, soils were screened with an organic vapor analyzer to determine the extent of contamination. Approximately 200 cubic yards of contaminated soil were removed from the site and disposed of at Button Gwinnett Landfill in Lawrenceville, GA. Contaminated soil on the south end of the excavation could not be removed without undermining the foundation of the gazebo located on site.

Nine soil samples were collected from the excavation pit, 2 from the excavation floor and 7 from the excavation side walls. BTEX and TPH concentrations exceeded clean up levels specified in the Georgia UST regulations in force during the investigation (20 mg/kg and 100 mg/kg, respectively) in two of the sidewall samples (#6 and #7) collected at the south end of the excavation. BTEX was detected in sample #6 and #7 at concentrations of 258.17 mg/kg and 46.95 mg/kg, respectively. The TPH concentrations in sample #6 and #7 were 22,600 mg/kg and 3,670 mg/kg, respectively. TPH also exceeded clean up levels in the two samples collected from the tank bed. Sample #1 had a TPH concentration of 122 mg/kg and sample #2 had a TPH concentration of 187 mg/kg. Soil sampling results are summarized in Table 2.2.

2.3.4 Bioventing: 1992-1996

Beginning in August 1992, Battelle conducted bioventing pilot testing activities at the site of the former diesel fuel UST at Building 173. As part of the test, one vent well (VW) and three monitoring points (MPs) were installed at the site. VW and MP locations are shown in Figure 2.3. Two soil samples were collected from the VW borehole and one soil sample was collected from R1-MPA. Detailed pilot testing

SITE LAYOUT MAP
BUILDING 173 - FORMER DIESEL UST SITE
ROBINS AFB, GEORGIA

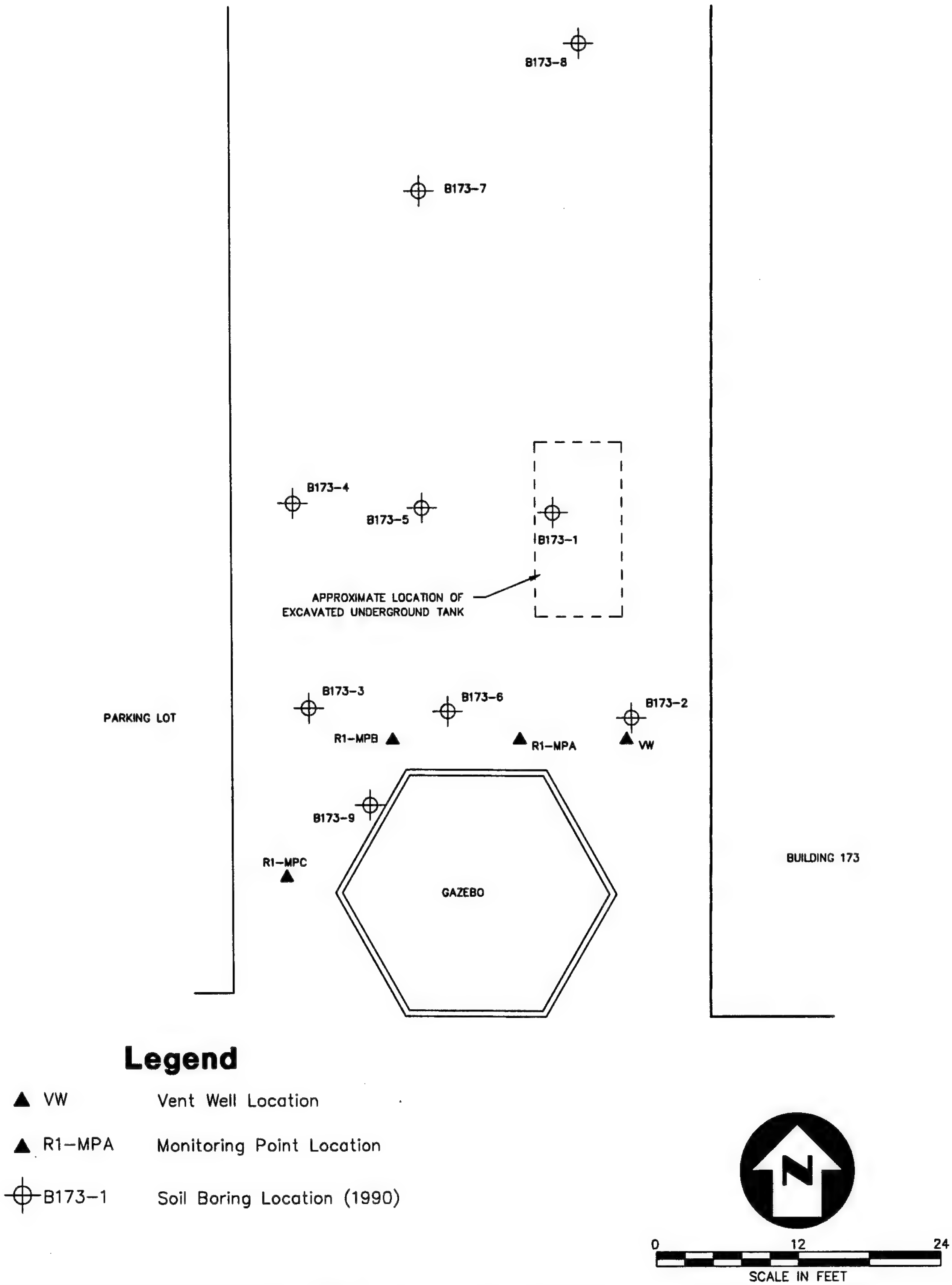


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Table 2.1
Soil Sample Analytical Results - January 1990
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

Sample ID	Depth (ft)	Benzene (mg/kg)(1)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
173-B1-2	8.5-10	ND(2)	ND	ND	89.42
173-B1-3	13.5-15	ND	0.51	0.22	0.11
173-B1-4	18.5-20	ND	0.24	ND	0.13
173-B1-5	23.5-25	ND	ND	ND	ND
173-B2-3	13.5-15	ND	ND	ND	ND
173-B4-3	13.5-15	ND	ND	ND	ND
173-B5-2	8.5-10	ND	0.23	0.53	0.27
173-B6-2	8.5-10	ND	ND	ND	ND
173-B8-3	13.5-15	ND	0.22	ND	0.43
173-B9-3	13.5-15	ND	0.20	0.52	0.27

(1) - mg/kg - milligrams per kilogram.
(2) - ND - not detected above laboratory detection limits. Detection limits are unknown.

Source: Battelle, 1992.

Table 2.2
Soil Sample Analytical Results - March 1992
Building 173 - Former Diesel UST Site
Robins AFB, GA

Sample Number	Sample Depth (ft)	TPH[1] (mg/kg)[2]	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	BTEX[3] (mg/kg)
1	8	122	<0.010	<0.010	<0.010	<0.020	<0.05
2	8	187	<0.010	<0.040	<0.010	<0.020	<0.08
3	8	50	<0.010	<0.020	<0.010	<0.020	<0.06
4	8	34	<0.010	<0.020	<0.010	<0.020	<0.06
5	8	41	<0.010	<0.020	<0.010	<0.020	<0.06
6	8	22,600	<0.10	1.87	17.30	239.00	258.17
7	8	3,670	<200	0.60	3.05	43.30	46.95
8	8	24	<0.010	<0.020	<0.010	<0.020	<0.06
9	8	29	<0.010	<0.040	<0.010	<0.020	<0.08

(1) - TPH - total petroleum hydrocarbons.
(2) - mg/kg - milligrams per kilogram.
(3) - Sum of benzene, toluene, ethylbenzene, and xylene components.

Source: Battelle, 1992.

procedures and results are presented in the Interim Report for Bioventing Field Initiative at Robins AFB, GA (Battelle, 1993). Results of the soil samples collected during the installation of the VW and MP borings indicated total BTEX concentrations ranging from 0.0037 mg/kg to 3.33 mg/kg. TPH concentrations in the soil samples ranged from 8 mg/kg to 5,700 mg/kg. Soil gas analysis indicated concentrations of total BTEX ranging from 0.244 parts per million volume per volume (ppmv) to 2.54 ppmv and TPH concentrations ranging from 27 ppmv to 300 ppmv (Table 2.3). The respiration test conducted at the site indicated relatively low oxygen utilization and carbon dioxide production rates. The biodegradation rates measured at the site were fairly consistent between monitoring points, with rates ranging from 0.38 to 0.75 milligrams of TPH degraded per kilogram of soil per day (mg/kg/day) based on oxygen utilization and from 0.31 to 0.68 mg/kg/day based on carbon dioxide production, with a good correlation between the oxygen utilization and carbon dioxide production rates. The soil gas permeability and radius of influence tests were inconclusive. Battelle selected an air blower which would provide an injection flow rate of 12 cubic feet per minute (cfm).

Air injection at the Building 173 former diesel UST site began in September 1992. Soil gas samples collected in May 1994 showed decreases in TPH and total BTEX concentrations. TPH concentrations decreased by 99.9 percent in VW and in R1-MPA at a depth of 21.8 feet bgs (R1-MPA-21.8) and by 95 percent in R1-MPC-15.0. TPH concentrations decreased in the VW from 300 ppmv to 0.27 ppmv; from 290 ppmv to 1.7 ppmv in R1-MPA-21.8; and from 27 ppmv to 1.4 ppmv in R1-MPC-15.0. Initial total BTEX concentrations measured in the soil gas samples collected in August 1992 were relatively low. Soil gas samples collected in May 1994 showed a decrease in total BTEX in the VW from 2.54 ppmv to below detection limits; from 0.917 ppmv to 0.126 ppmv in R1-MPA-21.8; and from 0.244 ppmv to 0.212 ppmv in R1-MPC-15.0.

Total BTEX concentrations in soil samples collected in June 1995 showed little variation from those collected in August 1992. Initial total BTEX concentrations were 3.33 mg/kg (VW-4.0), 0.0037 mg/kg (VW-18.5), and 0.09 mg/kg (R1-MPA-8.5). Samples collected in June 1995 had total BTEX concentrations of 4.2 mg/kg (VW-4.0), below detection limits (VW-18.5), and 0.36 mg/kg (R1-MPA-8.5). TPH concentrations in VW-18.5 decreased from 8.0 mg/kg to below the detection limit. In R1-MPA-8.5, TPH concentrations decreased from 5,700 mg/kg to 48.1 mg/kg. The TPH concentration in the soil sample collected from VW-4.0 increased from 37 mg/kg to 968 mg/kg. This increase in concentration may be attributable to spatial variations in TPH concentrations in the soil. A comparison of soil and soil gas analytical results from August 1992 and June 1995 is presented in Table 2.3.

2.3.4 Groundwater Investigation: 1995

The GA EPD letter to Col. Marshall of Robins AFB, dated December 21, 1994, stated that three monitoring wells were required to check the remediation progress at

Table 2.3
Soil and Soil Gas Sample Analytical Results
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

	Sample Location					
	VW		**MPA-21.8'**		**MPC-15.0'**	
Analyte (units)	**Aug-92**	**May-94**	**Aug-92**	**May-94**	**Aug-92**	**May-94**
Hydrocarbons in Soil Gas						
TPH[1] (ppmv)[2]	300	0.27	290	1.7	27	1.4
Benzene (ppmv)	<0.0040	<0.0020	<0.0020	0.067	<0.0020	0.19
Toluene (ppmv)	0.025	<0.0020	0.052	0.02	0.0060	0.012
Ethylbenzene (ppmv)	0.31	<0.0020	0.055	<0.0020	0.14	<0.0020
Xylenes (ppmv)	2.2	<0.0020	0.81	0.039	0.098	0.01
BTEX (ppmv)	2.535	<0.0080	0.917	0.126	0.244	0.212
	VW-4.0'		**VW-18.5'**		**MPA-8.5'**	
	Aug-92	**Jun-95**	**Aug-92**	**Jun-95**	**Aug-92**	**Jun-95**
Hydrocarbons in Soil						
TPH (mg/kg)[3]	37	968	8.0	<9.97	5,700	48.1
Benzene (mg/kg)	<0.29	<0.050	<0.00070	<0.050	<0.00070	<0.049
Toluene (mg/kg)	<0.33	<0.050	<0.00080	<0.050	0.0020	<0.049
Ethylbenzene (mg/kg)	0.33	2.4	<0.00060	<0.050	0.0090	<0.049
Xylenes (mg/kg)	3	1.8	0.0037	<0.13	0.0790	0.36
BTEX[4] (mg/kg)	3.3	4.2	0.0037	<0.28	0.09	0.36

(1) - TPH - total petroleum hydrocarbons.

(2) - ppmv - parts per million, volume per volume.

(3) - mg/kg - milligrams per kilogram.

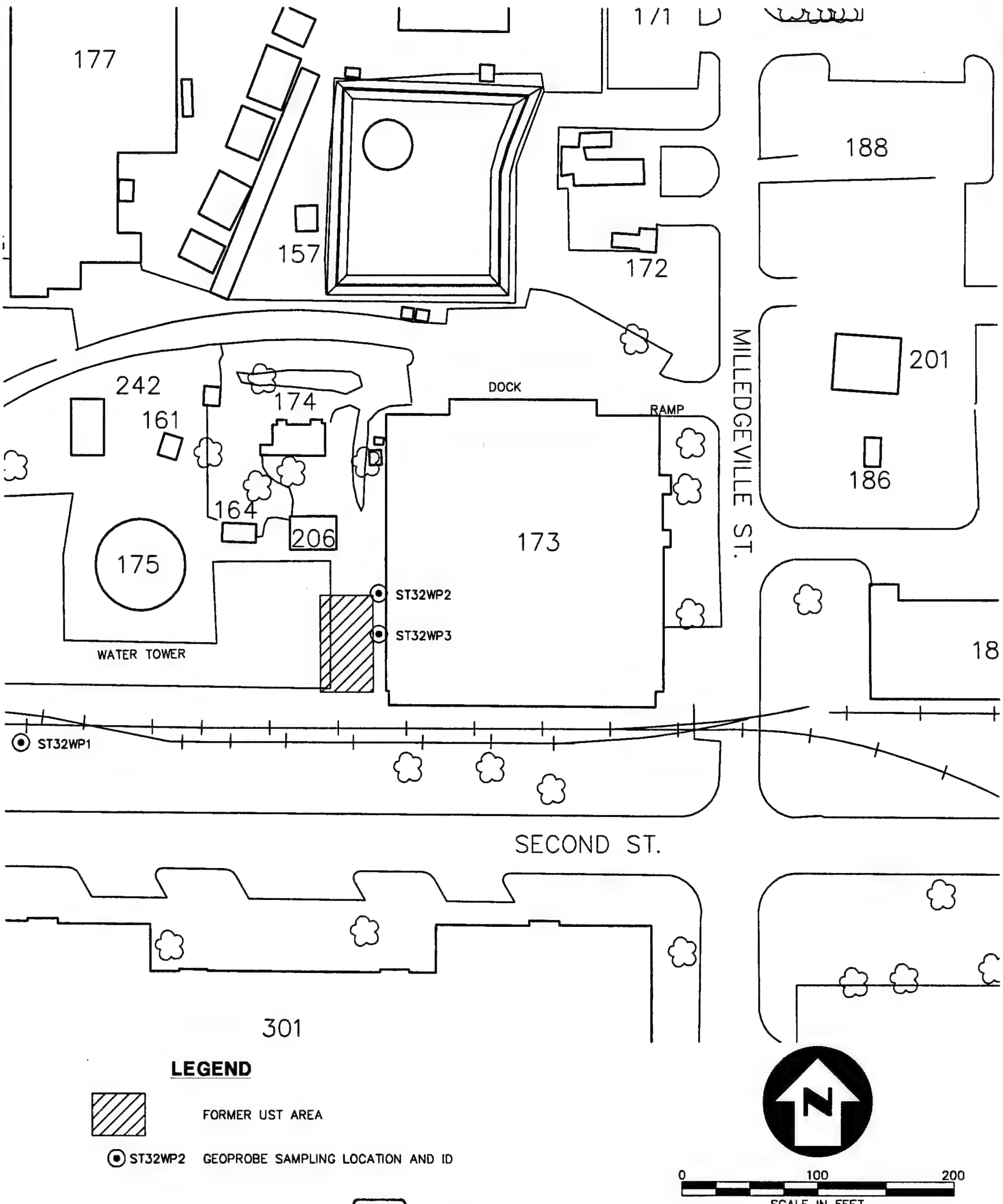
(4) - Sum of benzene, toluene, ethylbenzene, and xylenes components.

Source: Battelle, 1995.

Building 173 UST removal site. Permission was granted to Robins AFB by the GA EPD to use Geoprobe® sample locations instead of installing permanent monitoring wells.

In July 1995, three groundwater samples were collected from the three Geoprobe® sampling locations at the site (Figure 2.4). Groundwater samples were collected from depths ranging from 44 to 48 feet bgs and analyzed by an on-site laboratory for volatile organic compounds (VOCs). Samples for TPH analysis were shipped off-site to Pace Laboratories for analysis. BTEX constituents in each of the groundwater samples collected were below the allowable Federal MCLs for drinking water. TPH was below the detection limit in each of the groundwater samples analyzed. A duplicate sample for VOCs was sent to Pace Laboratories for analysis and results indicated BTEX constituents were below detection limits.

GROUNDWATER SAMPLING LOCATIONS (1995)
BUILDING 173 - FORMER DIESEL UST SITE
ROBINS AFB, GEORGIA



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SECTION 3
SITE CLOSURE SAMPLING AND ANALYSIS ACTIVITIES

The purpose of this section is to describe site closure and soil and groundwater sampling activities, including borehole locations and sampling depths, sampling procedures, analytical methods used, and QA/QC procedures followed. These methods/procedures are described in the closure SAP for Building 173 - Former Diesel UST Site (see Appendix A). The closure SAP was implemented under the direct supervision of a Georgia Professional Engineer.

3.1 SITE CLOSURE BOREHOLE LOCATIONS AND SAMPLING DEPTHS

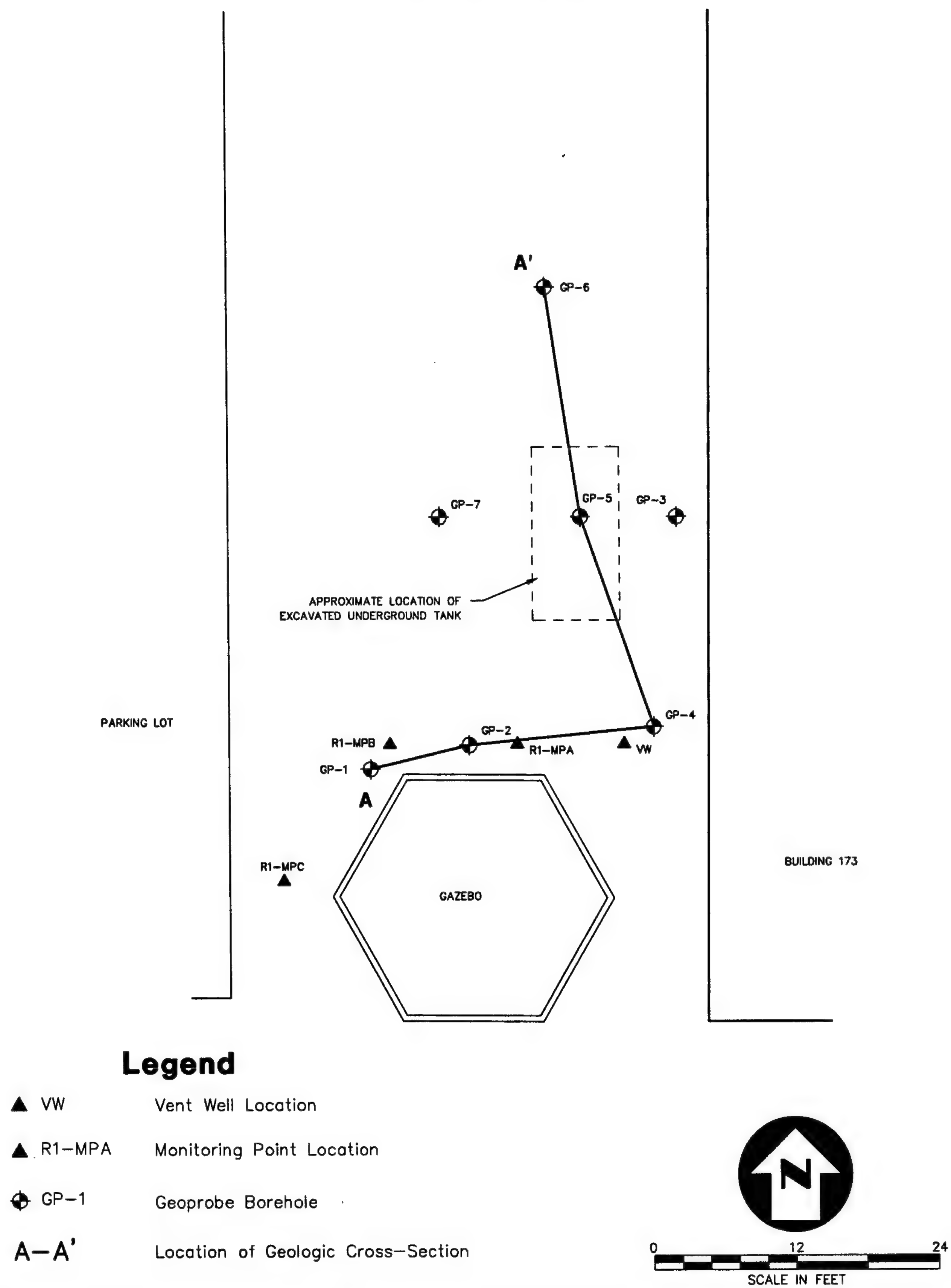
Closure soil and groundwater sampling was conducted at the site from July 31 to August 2, 1996. Seven additional boreholes (GP-1 through GP-7) were advanced at the site and soil and groundwater samples were collected to confirm that hydrocarbon concentrations have been remediated to within acceptable levels. Boring GP-1 was advanced between monitoring points R1-MPC and R1-MPB, GP-2 was advanced adjacent to R1-MPA, GP-3 was advanced on the east side of the former UST pit, GP-4 was advanced adjacent to the existing VW, GP-5 was advanced in the area of the former UST location, and GP-6 and GP-7 were advanced west and north of the former UST location, respectively. Confirmatory soil sampling borehole locations are shown on Figure 3.1. Samples for possible chemical analysis were collected continuously from ground surface to the total depth of the boring. Field evidence of contamination (i.e., soil with above-background photoionization detector [PID] readings) was observed in many of the samples; however, significant contamination (i.e., soil with PID readings greater than 20 ppmv, petroleum odor, or discoloration) was observed in only one sample.

3.2 DRILLING, SAMPLING, AND EQUIPMENT DECONTAMINATION

Boreholes were advanced using a truck-mounted Geoprobe® hydraulic piston/hammer. Cuttings and residual soil samples generated during sampling activities were placed in a US Department of Transportation (DOT)-approved 55-gallon drum. At the request of Robins AFB, this drum was left on site. After receipt of the analytical results, the soil cuttings were disposed at the Houston County Landfill {EPD Program ID: 076-020D (SL)} on October 17, 1996.

Approximately two gallons of purge water were generated during groundwater sampling activities and discharge directly to the Access Road decon pad. This procedural

SITE CLOSURE BOREHOLE LOCATIONS
BUILDING 173 - FORMER DIESEL UST SITE
ROBINS AFB, GEORGIA



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change for purge water handling was approved on August 1, 1996 by Fred Hursey of Robins AFB Environmental Management Directorate, Restoration Division (EMR).

Lithologic descriptions of the soil samples were performed in the field by a Parsons ES geologist. Soil types were classified according to the Unified Soil Classification System (USCS) and described in accordance with the standard Parsons ES soil description format. These geologic borehole logs are presented in Appendix B. A cross-section of site soils is presented on Figure 3.2.

Prior to arriving at the site, the Geoprobe ® rig, sample barrels, and other downhole equipment was decontaminated using a high-pressure, steam/hot water wash followed by a rinse with potable water. All sampling tools were decontaminated prior to use and between each use as described below:

- Scrub the equipment with a solution of hot potable water and Alconox® detergent. Rinse equipment with copious quantities of cold potable water followed by a reagent grade Type II water rinse;
- Rinse equipment with pesticide-grade isopropanol;
- Air dry;
- Wrap in oil-free aluminum foil if equipment was to be stored or transported.

Decontamination was performed at the Access Road Decon Pad and fluids resulting from decontamination allowed to drain into the floor drain at the Decon Pad.

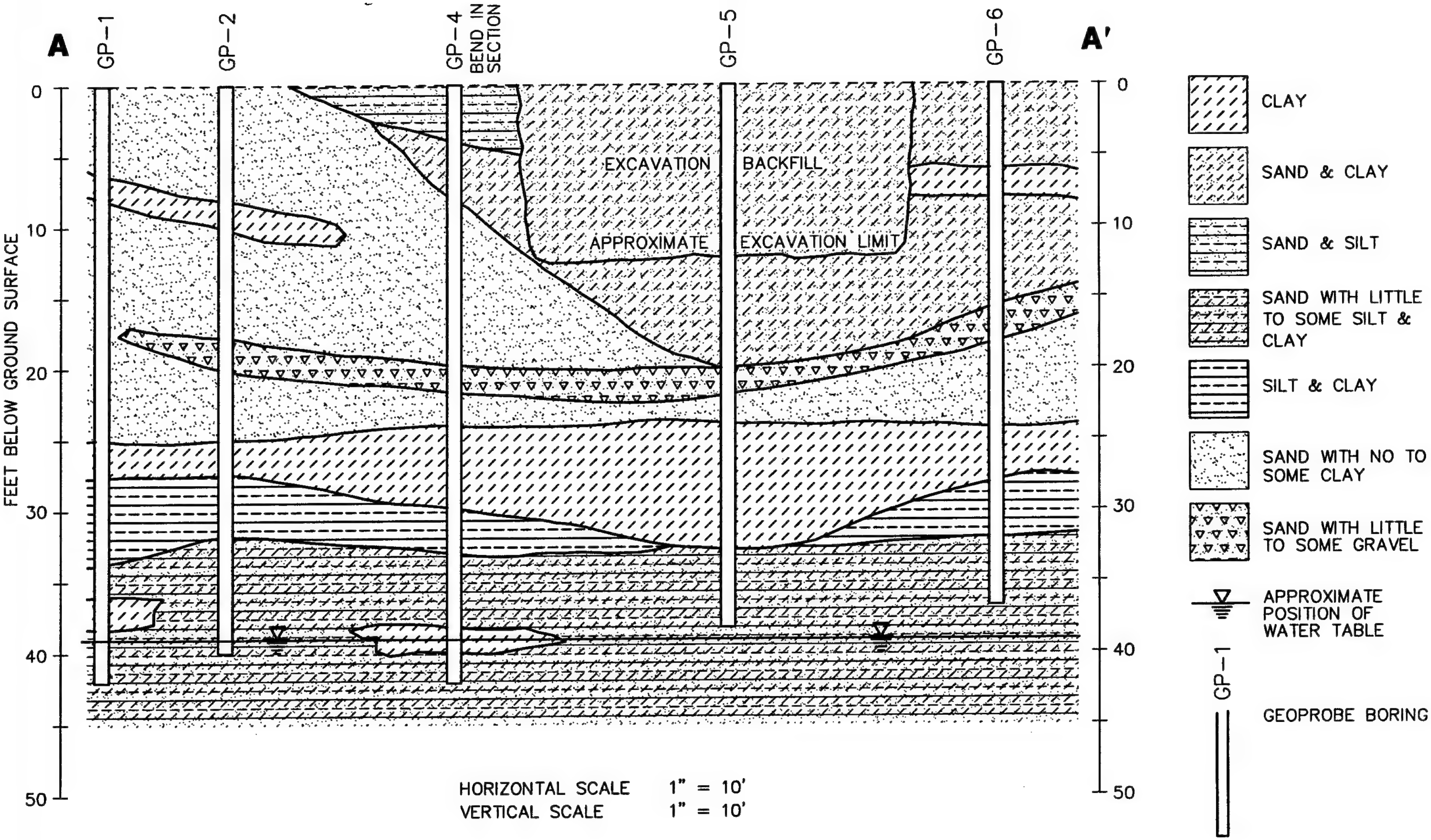
Relatively undisturbed soil samples, suitable for chemical analysis, were collected continuously from ground surface to the total depth of the boring. Soil samples were collected by pushing/hammering a 2-inch outer diameter (OD) metal core sampler equipped with an acetate liner. The drill stem consisted of threaded rods 4 feet in length, which were advanced to the desired sampling depth. Soil entered the core sampler upon advancement and was retained in the clean acetate liner. Core samplers used for the confirmation sampling were 4 feet in length.

The acetate liner was removed from the core sampler immediately after the rods and core sampler were retracted from the boring. Each 4 foot acetate liner was cut into two equal parts and capped immediately following the removal of a small portion of soil for lithologic description and headspace screening. Each 2-foot acetate liner section was labeled with the appropriate sample depth and boring number pending results of the headspace analysis.

The headspace analysis portion of the sample was placed in a clean Ziploc® bag and allowed to equilibrate for approximately 10 minutes. The bag was then pierced with the detector probe of the PID and a headspace reading was measured. Headspace samples

Figure 3.2

CROSS-SECTION A-A'
BUILDING 173-FORMER DIESEL UST SITE
ROBINS AFB, GEORGIA



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were used to evaluate the relative concentration of hydrocarbons in the soil samples and aid in laboratory sample selection. A summary of the soil headspace screening results is presented on the individual boring logs presented in Appendix B.

Soil samples selected for laboratory analysis were placed in clean sampling containers, labeled with the site name and borehole number, sample depth, date of collection, and other pertinent data. Samples were sealed in plastic bags and placed in an insulated shipping container packed with ice. Samples for laboratory analysis were shipped under standard chain-of-custody procedures to Inchcape Testing Services, an AFCEE-approved laboratory, located in Richardson, Texas.

Groundwater samples were collected by driving the Geoprobe® rods approximately 3 to 4 feet into the saturated soil zone. After the saturated soil zone was encountered, the rods were extracted approximately 4 feet and a 4 foot section of screen contained inside of the lead rod was extended into the saturated zone. The depth to water was measured with a Slope® water level indicator and approximately 4 casing volumes were purged from the well. The temperature, pH, and specific conductivity of the groundwater was measured and recorded after removing each casing volume. Groundwater samples were collected after the temperature, pH, and conductivity had stabilized to within ± 1° C for temperature, ± 0.1 units for pH, and ± 5 percent for conductivity. Clean polyethylene tubing equipped with a check valve was inserted to the top of the water column to purge and sample groundwater. Water extraction was accomplished by slowly raising and lowering the end of the tubing into the water column, forcing water up through check valve and tubing. Purge water generated during groundwater sampling activities were discharged at the Access Road decon pad. Groundwater samples were collected in clean sample bottles containing the appropriate preservative, labeled with the site name and borehole number, date and time of collection, and other pertinent data. Samples were sealed in plastic bags and placed in an insulated shipping container packed with ice. Samples were shipped under standard chain-of-custody procedures to Inchcape Testing Services for analysis.

At the completion of each borehole, bentonite was used to seal the borehole to prevent the creation or enhancement of contaminant migration pathways to groundwater.

3.3 FIELD AND LABORATORY DATA QUALITY ASSURANCE/QUALITY CONTROL

Eight QA/QC samples were collected during field activities. The samples included two equipment blanks (one for each media sampled), one field duplicate, two field replicates, and three trip blanks.

3.4 SOIL AND GROUNDWATER SAMPLE ANALYSIS

All samples were analyzed by Inchcape Testing Services, an AFCEE-approved laboratory. All soil samples were analyzed by EPA Method SW8020 for BTEX, EPA

Method SW8310 for PAHs, and EPA Method SW8015 (modified) for TPH - diesel range organics (DRO) in accordance with GA EPD guidelines (GA EPD, 1995b). Two soil samples were also analyzed for grain size distribution by American Society of Testing and Materials (ASTM) Method D421/D422 and total organic carbon (TOC) by EPA Method SW9060. All groundwater samples were analyzed by EPA Method SW8020 for BTEX, EPA Method 8310 for PAHs, and EPA Method SW8015 (modified) for TPH (DRO).

SECTION 4
RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

This section summarizes the analytical results from the confirmatory soil and groundwater sampling conducted at the former diesel UST site at Building 173. Based on earlier site investigations and bioventing pilot testing, and on the results of the closure sample analyses, conclusions regarding remediation of fuel contaminants in vadose zone soils are summarized, and recommendations for the site are presented.

4.1 LABORATORY RESULTS

Complete soil analytical results from Inchcape Testing Services are presented in Appendix C and summarized in Table 4.1. A total of 16 confirmatory soil samples, including two field replicates, were collected from the former UST site at Building 173 and submitted for laboratory analysis of BTEX, TPH (DRO), and PAHs. Two soil samples were collected from each boring: one with the highest headspace reading and one from the base of the boring above the water table. Replicate samples were collected from borings GP-3 and GP-7. BTEX constituents were detected in 6 of the 16 samples submitted for analysis. Total BTEX ranged from 0.001 mg/kg in sample GP-7 collected from a depth of 20 to 22 feet bgs to 11.6 mg/kg in sample GP-4 collected at a depth of 8 to 10 feet bgs. Benzene was not detected above laboratory detection limits in any of the samples submitted for analysis. Ethylbenzene was detected in one sample (GP4-8-10') at a concentration in exceedance of the applicable soil threshold levels. The ethylbenzene concentration in the sample collected from 8 to 10 feet bgs in boring GP-4 was 0.8 mg/kg. PAHs were detected in 5 of the 16 soil samples submitted for analysis. PAH concentrations exceeded the soil threshold levels in only one sample (GP5-14-16') submitted for analysis. PAH constituents detected above soil threshold levels in GP-5 (14-16') were: benzo(a)pyrene (1.06 mg/kg); benzo(b)flouranthene (1.14 mg/kg); chrysene (0.677 mg/kg); and indeno(1,2,3-c,d)pyrene (0.936 mg/kg). All other PAH constituents detected were below the applicable soil threshold levels. TPH (DRO) was detected in 3 of the 16 samples submitted for analysis. The highest TPH (DRO) concentration (615 mg/kg) was detected in sample GP-4 at a depth of 8 to 10 feet bgs. TPH (DRO) was also detected in sample GP5-14-16' and GP5-23-25' (duplicate sample of GP5-14-16') at concentrations of 74.9 mg/kg and 313 mg/kg, respectively. Two soil samples were also grain size distribution and TOC. The soils from this depth range were predominately sand and silt with minor amounts of clay. The TOC results ranged from less than 200 mg/kg to 216 mg/kg. Grain size distribution and TOC analytical results are presented in Table 4.2

Table 4.1
Confirmatory Soil Sample Analytical Results
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

Sample location and depth (feet below ground surface)	**GP1-14-16'**	**GP1-36-38'**	**GP2-6-8'**	**GP2-34-36'**	**GP3-8-10**	**GP3-42-44**
Date	**7/31/96**	**7/31/96**	**7/31/96**	**7/31/96**	**8/1/96**	**8/1/96**
BTEX, SW8020 (mg/kg)[1]						
Benzene	< 0.001[2]	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Ethylbenzene	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Xylenes	< 0.004	< 0.004	**0.002**[3]	< 0.004	< 0.004	< 0.004
Total BTEX	< 0.009	< 0.009	**0**	< 0.009	< 0.009	< 0.009
Polynuclear Aromatic Hydrocarbons, SW8310 (mg/kg)						
Acenaphthene	< 1.30	< 1.41	< 1.33	< 1.25	< 1.36	< 1.27
Acenaphthylene	< 1.66	< 1.81	< 1.71	< 1.61	< 1.74	< 1.63
Anthracene	< 0.475	< 0.516	< 0.488	< 0.460	< 0.497	< 0.467
Benzo(a)anthracene	< 0.0097	< 0.0106	< 0.0100	< 0.0094	**0.315**	< 0.0095
Benzo(a)pyrene	< 0.0162	< 0.0176	< 0.0166	< 0.0157	**0.350**	< 0.0159
Benzo(b)fluoranthene	< 0.0130	< 0.0141	< 0.0133	< 0.0125	**0.409**	< 0.0127
Benzo(ghi)perylene	< 0.0540	< 0.0587	< 0.0554	< 0.0523	**0.277**	< 0.0531
Benzo(k)fluoranthene	< 0.0119	< 0.0129	< 0.0122	< 0.0115	**0.186**	< 0.0117
Chrysene	< 0.108	< 0.117	< 0.111	< 0.104	**0.167**	< 0.106
Dibenzo(a,h)anthracene	< 0.0216	< 0.0235	< 0.0222	< 0.0209	**0.0328**	< 0.0212
Fluoranthene	< 0.151	< 0.164	< 0.155	< 0.146	**0.930**	< 0.149
Fluorene	< 0.151	< 0.164	< 0.155	< 0.146	< 0.158	< 0.149
Indeno(1,2,3-c,d)pyrene	< 0.0324	< 0.0352	< 0.0333	< 0.0314	**0.263**	< 0.0319
Naphthalene	< 1.30	< 1.41	< 1.33	< 1.25	< 1.36	< 1.27
Phenanthrene	< 0.454	< 0.493	< 0.466	< 0.439	**0.646**	< 0.446
Pyrene	< 0.194	< 0.211	< 0.200	< 0.188	**0.643**	< 0.191
TPH (DRO), 8015M (mg/kg)	< 10.8	< 11.7	< 11.1	< 10.4	< 11.3	< 10.6

Notes:
(1) mg/kg - milligrams per kilogram
(2) < #.### - Analyte not detected at a concentration above the reporting limit of #.###
(3) Bold - analyte detected at a concentration above the method detection limit.

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Table 4.1 -- Continued
Confirmatory Soil Sample Analytical Results
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

Sample ID	**GP4-8-10'**	**GP4-37-39**	**GP5-14-16'**	**GP5-23-25'(4)**	**GP5-36-38'**	**GP6-14-16'**
Date	**8/1/96**	**8/1/96**	**8/1/96**	**8/1/96**	**8/2/96**	**8/2/96**
BTEX, SW8020 (mg/kg)						
Benzene	< 0.3	< 0.001	< 0.03	< 0.001	< 0.001	< 0.001
Toluene	< 0.5	< 0.002	< 0.06	**0.010**	< 0.002	< 0.002
Ethylbenzene	$\boxed{\mathbf{0.8}}$(5)	< 0.002	**0.10**	< 0.002	< 0.002	< 0.002
Xylenes	**10.8**	< 0.004	**1.00**	< 0.004	< 0.004	< 0.004
Total BTEX	**10.8**	< 0.009	**1.10**	**0.010**	< 0.009	< 0.009
Polynuclear Aromatic Hydrocarbons, SW8310 (mg/kg)						
Acenaphthene	< 1.31	< 1.29	< 7.08	< 7.15	< 1.33	< 1.43
Acenaphthylene	< 1.68	< 1.66	< 9.09	< 9.18	< 1.71	< 1.84
Anthracene	< 0.479	< 0.474	< 2.60	< 2.62	< 0.488	< 0.525
Benzo(a)anthracene	**0.0120**	< 0.0097	**1.12**	**0.657**	< 0.0100	**0.0621**
Benzo(a)pyrene	**0.0163**	< 0.0162	$\boxed{\mathbf{1.06}}$	**0.600**	< 0.0166	**0.0788**
Benzo(b)fluoranthene	< 0.0131	< 0.0129	$\boxed{\mathbf{1.14}}$	**0.659**	< 0.0133	**0.0561**
Benzo(ghi)perylene	< 0.0544	< 0.0538	**0.932**	**0.397**	< 0.0554	< 0.0597
Benzo(k)fluoranthene	< 0.0120	< 0.0118	**0.518**	**0.290**	< 0.0122	**0.0334**
Chrysene	< 0.109	< 0.108	$\boxed{\mathbf{0.677}}$	< 0.596	< 0.111	< 0.119
Dibenzo(a,h)anthracene	< 0.0218	< 0.0215	< 0.118	< 0.119	< 0.0222	< 0.0239
Fluoranthene	< 0.152	< 0.151	**3.07**	**1.81**	< 0.155	**0.181**
Fluorene	< 0.152	< 0.151	< 0.826	< 0.834	< 0.155	< 0.167
Indeno(1,2,3-c,d)pyrene	< 0.0326	< 0.0323	$\boxed{\mathbf{0.936}}$	**0.409**	< 0.0333	**0.0633**
Naphthalene	< 1.31	< 1.29	< 7.08	< 7.15	< 1.33	< 1.43
Phenanthrene	< 0.457	< 0.452	**2.70**	< 2.50	< 0.466	< 0.501
Pyrene	< 0.196	< 0.194	**2.61**	**1.30**	< 0.200	< 0.215
TPH (DRO), 8015M (mg/kg)	**615**	< 10.8	**74.9**	**313**	< 11.1	< 11.9

(4) GP5-23-25' is a replicate sample of GP5-14-16'.
(5) Box - concentration exceeds applicable soil threshold level.

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Table 4.1 -- Continued
Confirmatory Soil Sample Analytical Results
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

Sample ID	GP6-35-37'	GP7-20-22'	GP7-30-32'[(6)]	GP7-36-38
Date	8/2/96	8/2/96	8/2/96	5/30/96
BTEX, SW8020 (mg/kg)				
Benzene	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	< 0.002	**0.001 J[(7)]**	**0.002 J**	< 0.002
Ethylbenzene	< 0.002	< 0.002	< 0.002	< 0.002
Xylenes	< 0.004	< 0.004	< 0.004	< 0.004
Total BTEX	< 0.009	**0.001 J**	**0.002 J**	< 0.009
Polynuclear Aromatic Hydrocarbons, SW8310 (mg/kg)				
Acenaphthene	< 1.26	< 1.25	< 1.24	< 1.46
Acenaphthylene	< 1.62	< 1.60	< 1.60	< 1.88
Anthracene	< 0.462	< 0.457	< 0.456	< 0.536
Benzo(a)anthracene	< 0.0095	< 0.0094	< 0.0093	< 0.0110
Benzo(a)pyrene	< 0.0158	< 0.0156	< 0.0155	< 0.0183
Benzo(b)fluoranthene	< 0.0126	< 0.0125	< 0.0124	< 0.0146
Benzo(ghi)perylene	< 0.0525	< 0.0520	< 0.0518	< 0.0609
Benzo(k)fluoranthene	< 0.0116	< 0.0114	< 0.0114	< 0.0134
Chrysene	< 0.105	< 0.104	< 0.104	< 0.122
Dibenzo(a,h)anthracene	< 0.0210	< 0.0208	< 0.0207	< 0.0244
Fluoranthene	< 0.147	< 0.146	< 0.145	< 0.171
Fluorene	< 0.147	< 0.146	< 0.145	< 0.171
Indeno(1,2,3-c,d)pyrene	< 0.0315	< 0.0312	< 0.0311	< 0.0365
Naphthalene	< 1.26	< 1.25	< 1.24	< 1.46
Phenanthrene	< 0.441	< 0.437	< 0.435	< 0.512
Pyrene	< 0.189	< 0.187	< 0.187	< 0.219
TPH (DRO), 8015M (mg/kg)	< 10.5	< 10.4	< 10.4	< 12.2

(6) GP7-30-32' is a replicate sample of GP7-20-22'.
(7) J - Estimated Value

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Table 4.2
Grain Size Distribution and Total Organic Carbon Results
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

Sample ID **Date**	**Units**	**GP4-37-39** **8/1/96**	**GP5-36-38'** **8/2/96**
Grain Size Distribution, ASTM D421/D422			
Gravel and Coarse Sand (> 2.00 mm)	% by weight	<0.1	<0.1
Medium and Fine Sand (0.075 to 2.00 mm)	% by weight	89.9	44.9
Silt (0.005 to 0.075 mm)	% by weight	9.2	39.8
Clay/Colloids (< 0.005 mm)	% by weight	1.0	15.3
Total Organic Carbon, SW9060	mg/kg	< 200	216

Two groundwater samples (one sample and a duplicate sample) were collected during the investigation and submitted for analysis of BTEX, PAHs, and TPH (DRO). BTEX and PAH constituents were not detected in either of the samples submitted for analysis. TPH (DRO) was detected in sample RAFB-GP9 (duplicate sample of RAFB-GP3A) at a concentration of 783 µg/L. Groundwater analytical results are presented in Table 4.3. Laboratory data reports and chain of custody records are presented in Appendix C.

The detection of TPH (DRO) in sample RAFB-GP9, as an indicator of petroleum hydrocarbons in shallow groundwater, is suspect for several reasons: TPH (DRO) was not detected in the primary sample RAFB-GP3A; No BTEX or PAH compounds were detected in either groundwater sample; and TPH (DRO) was delineated to non-detect within the vadose zone soils which indicates that petroleum hydrocarbons from the site have not migrated to groundwater. A possible explanation for the detection is that TPH analyses are vulnerable to sources of positive interference (Zemo *et al*, 1995). Among the sources of positive interference which may have present in groundwater at the site include soluble, non-petroleum hydrocarbons and turbidity.

4.2 CALCULATION OF ALTERNATE THRESHOLD LEVELS

4.2.1 Description of STLs and ATLs

The STLs listed in the GUSTA Rules are specified for two pollution susceptibility classifications and four different potential receptor scenarios. A pollution susceptibility classification (Average to Higher Groundwater Pollution Susceptibility or Lower Groundwater Pollution Susceptibility) has been assigned to all regions of the State based on the following physical characteristics: depth to water, recharge, aquifer type, surface soil type, topography, vadose zone characteristics, and hydraulic conductivity of the upper-most aquifer. The receptor scenarios are separated by the type of potential receptor (i.e., drinking water withdrawal point or surface water body) and the respective distance to the potential receptor. The Georgia EPD utilized a one-dimensional vadose zone flow and transport approach and a two-dimensional saturated zone flow and transport approach to calculate the STLs listed in the GUSTA Rules. For each combination of susceptibility area and receptor scenario, "worst case" model input parameters were selected. However, recognizing that actual site conditions may differ from the assumed "worst case" conditions, the GUSTA Rules allow for the calculation of ATLs which incorporate site-specific data (e.g., vertical travel distance within the vadose zone, lithology, hydraulic conductivity, TOC for soil).

4.2.2 Alternate Threshold Levels Approach

Calculation of ATLs for soils at the site was performed through refinement of the GUSTA Rules "worst case" scenario to a site-specific scenario by inclusion of TOC, lithologic, and depth to water data.

Table 4.3
Confirmatory Groundwater Sample Analytical Results
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

Sample ID	**RAFB-GP3A**	**RAFB-GP-9[1]**
Date	**8/2/96**	**8/2/96**
BTEX, SW8020 (ug/L)[2]		
Benzene	< 2.0[3]	< 2.0
Toluene	< 2.0	< 2.0
Ethylbenzene	< 2.0	< 2.0
Xylenes	< 4.0	< 4.0
Total BTEX	< 10.0	< 10.0
Polynuclear Aromatic Hydrocarbons, SW8310 (ug/L)		
Acenaphthene	< 18.0	< 18.0
Acenaphthylene	< 23.0	< 23.0
Anthracene	< 6.60	< 6.60
Benzo(a)anthracene	< 0.130	< 0.130
Benzo(a)pyrene	< 0.120	< 0.120
Benzo(b)fluoranthene	< 0.180	< 0.180
Benzo(ghi)perylene	< 0.760	< 0.760
Benzo(k)fluoranthene	< 0.170	< 0.170
Chrysene	< 1.50	< 1.50
Dibenzo(a,h)anthracene	< 0.300	< 0.300
Fluoranthene	< 2.10	< 2.10
Fluorene	< 2.10	< 2.10
Indeno(1,2,3-c,d)pyrene	< 0.430	< 0.430
Naphthalene	< 18.0	< 18.0
Phenanthrene	< 6.40	< 6.40
Pyrene	< 2.70	< 2.70
TPH (DRO), 8015M (ug/L)	< 500	**783[4]**

Notes:
(1) - RAFB-GP9 is a duplicate sample of RAFB-GP3A
(2) µg/L - micrograms per liter
(3) < #.### - Analyte not detected at a concentration above the reporting limit of #.###
(4) Bold - analyte detected at a concentration above the method detection limit.

TOC results from soils (GP4 37-39' and GP5 36-38') located between the affected soils and the water table indicate relatively low concentrations of naturally-occuring TOC in the site soils ranging from less than 200 mg/kg to 216 mg/kg. Assuming that the TOC concentration in GP4 37-39' sample is one-half the detection limit (i.e., 100 mg/kg), the average TOC concentration at the site is 158 mg/kg.

The vertical travel distance within the vadose zone is measured from the zone/depth of contamination to the water table. The depth of contamination at the site varied from 8 to 10 feet bgs at GP4 and 14 to 16 feet bgs at GP5. Based on water level measurements during groundwater sampling and visual examination of Geoprobe soil samples, the depth to water was estimated at 40 feet bgs. A vertical transport distance of 24 feet was calculated as the difference between the deepest zone of contamination (16 feet bgs) and the measured depth to water (40 feet bgs). However, in the ATL calculation this distance was modified based on the unique hydrogeologic setting within the vadose zone at the site. As discussed in Section 2.2, a dense clay layer was encountered at 24 to 25 feet bgs in each boring. Below this clay layer, a layer consisting of clay and silt was also encountered. The clay and clay/silt sequence varies from 7 to 9 feet in thickness across the site. Soils above and below this sequence, consist primarily of sand with varying amounts of silt and clay. Hydrologically, this clay and silt sequence controls the rate of movement of water and contaminants downward through the vadose zone due to the its low permeability. Stated in terms of travel times, the time required to travel through this clay and clay silt sequence is likely orders of magnitude greater than the time through the sand layers due to the differences in hydraulic conductivity. Therefore, for purpose of ATLs calculation, the vertical travel distance was assumed to be equal to the minimum thickness of the clay and silt sequence (7 feet) and all parameter assumptions related to lithology (e.g., total porosity, hydraulic conductivity, etc.) were conservatively based on a 50% clay and 50% silt mixture.

4.2.3 Alternate Threshold Level Results

Based on the assumptions above and the site-specific data collected, ATLs for ethylbenzene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene were calculated. The calculated ATLs are presented in Table 4.4. For each compound, the calculated ATL was higher than the maximum concentration detected in soil. The ATL calculation sheets are provided in Appendix D.

4.3 CONCLUSIONS

There was some field evidence of fuel hydrocarbon contamination (i.e., soil with above-background PID readings) in several samples collected from source area soil borings (GP4 and GP5). Based on the average to higher pollution susceptibility classification and a public water supply withdrawal point less than 500 feet from the site, the STLs listed in Table A of the GUSTA Rules (Table 1.1 in this document) apply. Except for several compounds (ethylbenzene and several PAHs), the concentrations detected in the vadose zone soils were below the STLs listed in Table A. Using

Table 4.4
Alternate Threshold Levels
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

Parameter	Alternate Threshold Level
Volatile Organic Compounds (mg/kg)[1]	
Ethylbenzene	5.6E+08[2]
Polynuclear Aromatic Hydrocarbons (mg/kg)	
Benzo(a)pyrene	6.16E+285[2]
Benzo(b)fluoranthene	2.94E+22[2]
Chrysene	6.54E+03
Indeno(1,2,3-c,d)pyrene	2.79E+58[2]

(1) - mg/kg - milligrams per kilogram.
(2) - ATL exceeds the expected soil concentration under free product conditions.
Calculation sheets are provided in Appendix E.

site-specific data, ATLs were calculated for the compounds which exceeded the STLs to simulate the contaminant behavior under site-specific condition rather than the "worst case" conditions assumed in the STLs. The ATLs for these compound were above the respective maximum detected concentrations in soil. These results indicate that site vadose zone soils have been fully remediated for the target compounds during the period of operation of the bioventing system.

4.4 RECOMMENDATIONS

Based on the site closure soil sample analytical results summarized in Table 4.1, site closure with no further remedial action at the site is recommended. This site meets all applicable soil threshold levels (STLs and ATLs) in soil and all applicable federal and State MCLs for groundwater. Therefore, it is requested that the Georgia EPD approve closure of the Building 173 Former Diesel UST site. Once closure of the site has been granted, it is recommended that the bioventing system be dismantled and removed from the site, and the VW and MPs to be properly abandoned in accordance with the well plugging procedures outlined in the Georgia EPD Manual for Groundwater Monitoring (GA EPD, 1991).

Analytical results from the recent closure soil sampling event provide sufficient evidence to support closure of the Building 173 Former Diesel UST Site. Source area vadose zone soils have been remediated to below applicable STLS and ATLs and no target compounds defined in the GUSTA Rules were detected in shallow groundwater immediately downgradient of the source area. Therefore, based on successful source removal using active remediation (bioventing) for soils and no impact to shallow groundwater, no further remedial action is recommended.

SECTION 5
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APPENDIX A
CLOSURE SAMPLING AND ANALYSIS PLAN

Closure Sampling and Analysis Plan
for
Building 173 Former Diesel UST Site
Robins AFB, Georgia

Prepared for:

Air Force Center for Environmental Excellence
Brooks AFB, Texas
and
Robins AFB, Georgia

June 1996

Parsons Engineering Science, Inc.
57 Executive Park South, N.E., Suite 500
Atlanta, Georgia 30329

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1. INTRODUCTION

This site closure sampling and analysis plan (SAP) has been prepared by Parsons Engineering Science, Inc. (Parsons ES) for submittal to Robins Air Force Base (Robins AFB) and the U.S. Air Force Center for Environmental Excellence (AFCEE).

Since 1992, Robins AFB has participated in the Air Force Bioventing Pilot Test Initiative Project for AFCEE and the Environmental Quality Directorate of the Air Force Armstrong Laboratory. The project included conducting more than 135 *in situ* bioventing pilot tests at 48 Air Force installations throughout the country. These tests were designed to collect data on the effectiveness of bioventing for the remediation of soil contaminated with fuel hydrocarbons (i.e., JP-4 jet fuel, diesel fuel, gasoline, heating oil, etc.). As part of this project, a bioventing pilot test was conducted at Robins AFB Building 173. The bioventing system began operation in September 1992 and currently remains in operation. Based on the results of this test, *in situ* bioventing has been effective enough to support closure of the former location of a 1,500 gallon diesel underground storage tank (UST) located at Building 173. This SAP presents a plan for confirmation groundwater and soil sampling to document the effectiveness of soil remediation at this site and to demonstrate compliance with regulatory requirements for closure.

This SAP consists of eight sections, including this introduction. Section 2 includes site description, history, and summary of previous investigations and remediation activities. Section 3 summarizes all applicable site closure requirements. A detailed site closure SAP is presented in Section 4. Analytical results will be presented in a site closure report as described in Section 5. The project implementation schedule is presented in Section 6. Section 7 provides site management information. Section 8 provides references cited in this SAP. It is anticipated that analytical results will support a no-further-action recommendation, and that site closure will be granted.

2. SITE DESCRIPTION AND HISTORY

Robins AFB is located in central Georgia approximately 18 miles south of Macon, adjacent to the town of Warner Robins. The boundaries of the Base encompass approximately 8,800 acres with facilities for operation, industrial, administrative, supply, and residential functions. A Base site plan is shown on Figure 2.1.

The primary missions of Robins AFB are the responsibilities assigned to the Warner Robins Air Logistics Center (WR-ALC), which has a three-fold mission as follows.

- *It is the worldwide logistics manager for assigned aircraft and commodities.* The WR-ALC is logistics manager for two Air Force transport aircraft (C-141 and C-130) and the F-15 fighter. In addition, electronics equipment managed at WR-ALC ties its support to every element of the aerospace combat force including seven missiles, four helicopters, two utility aircraft, and four drones and remotely piloted vehicles. In addition, Robins AFB is home for the Joint STARS and a B-1B Bomber Wing.

- *It is the repair center for aircraft and five distinct technologies.* WR-ALC is a major technology repair center for airborne electronics for the Air Force. In addition, aircraft repair and maintenance responsibilities for the F-15, C-141, and C-130 are assigned to WR-ALC. WR-ALC has various shops (plating, machining, metal bonding, painting, etc.) that support the major workload activities.

- *It serves as a storage center at wholesale and retail levels for Air Force spare parts and systems.* The third major mission involves receiving, storing, issuing, and transporting material. These functions are carried out in an automated warehouse on Base. Together with its worldwide mission, WR-ALC has responsibility for logistics support of Air Force installations in the geographical area including the eastern United States, Newfoundland, Greenland, Iceland, Bermuda, the Azores, and activities in Europe and the Middle East.

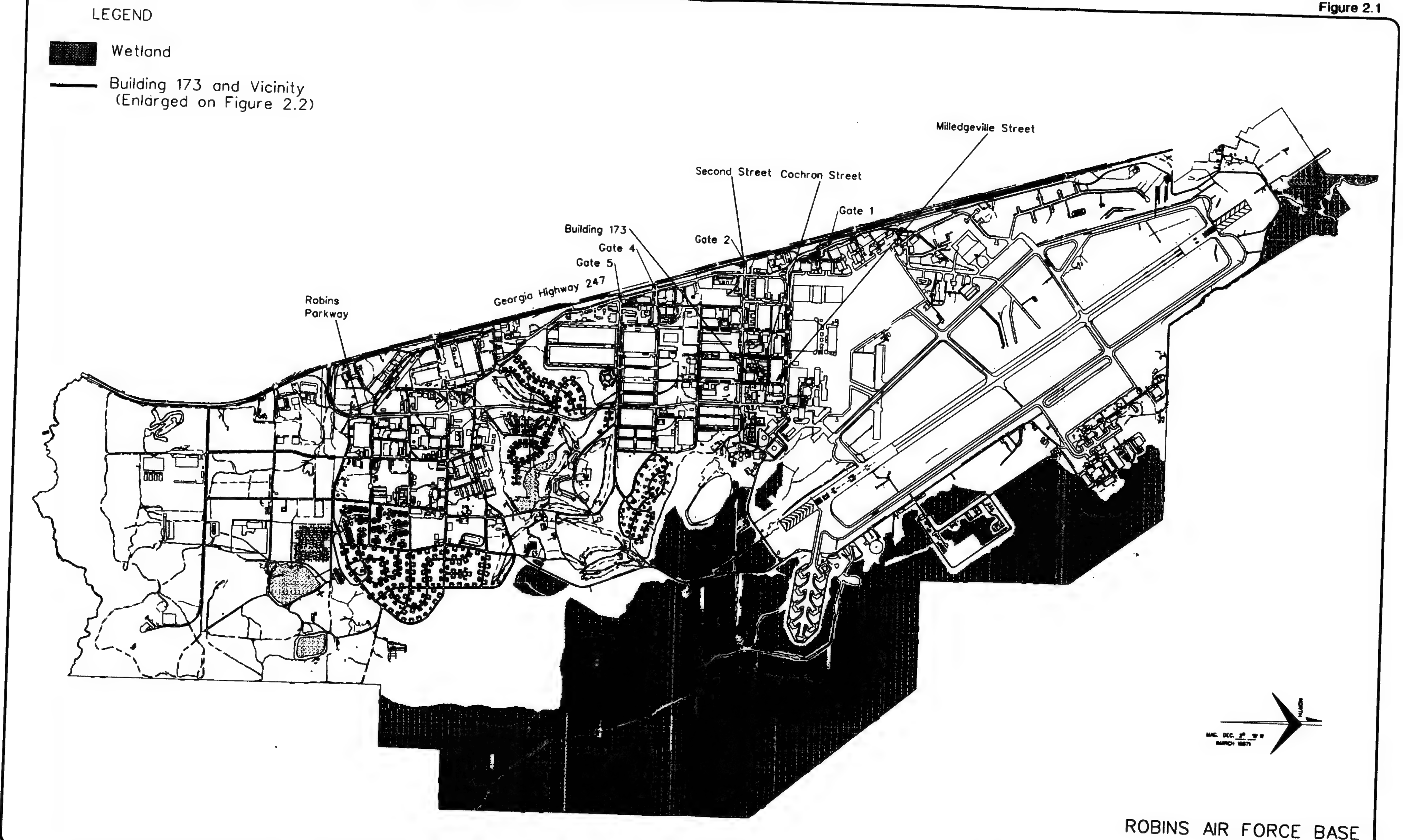
2.1 BUILDING 173 FORMER DIESEL UST SITE

Building 173 is located north of Second Street, east of Cochran Street, and west of Milledgeville Street (Figure 2.2). The area immediately surrounding the building is grass with an asphalt parking lot to the west and Milledgeville Street to the east. The former 1,500-gallon UST contained diesel fuel for use in emergency power generators. The UST was located on the west side of Building 173, in the area just north of an existing gazebo. The UST was abandoned in place approximately 22 years ago and was excavated and removed in October 1989. Analysis of soil samples collected from the excavation indicated the presence of petroleum hydrocarbon constituents.

2.2 SITE GEOLOGY

Soil borings advanced during previous site investigations have encountered three main soil units within the first 25 feet below ground surface (bgs). Dense, clayey sand

Figure 2.1



ROBINS AIR FORCE BASE
SITE PLAN

PARSONS ENGINEERING SCIENCE, INC.

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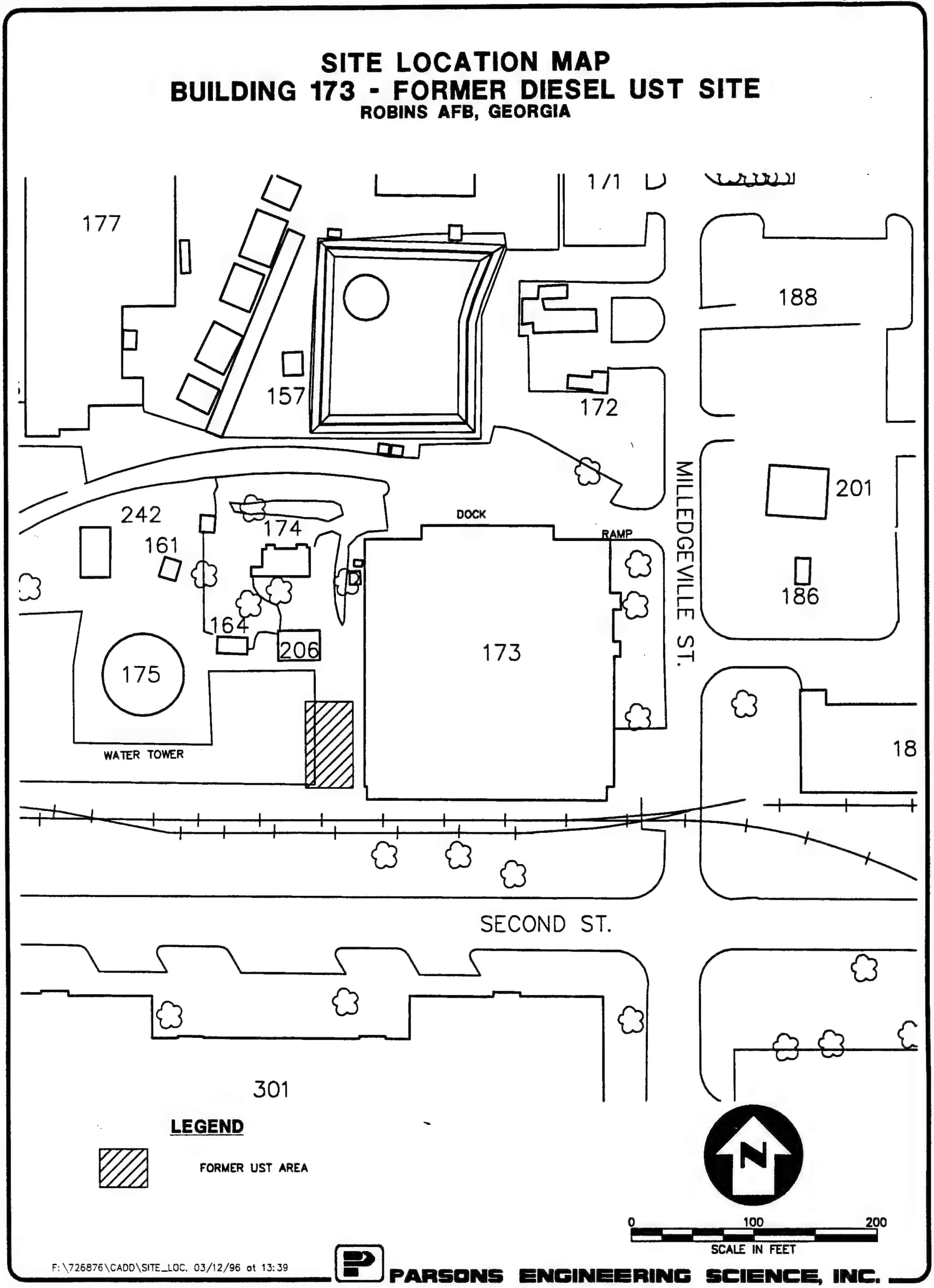
Figure 2.2


SITE LOCATION MAP
BUILDING 173 - FORMER DIESEL UST SITE
ROBINS AFB, GEORGIA
177
171
188
157
172
201
MILLEDGEVILLE ST.
DOCK
RAMP
242
174
161
186
164
206
173
175
WATER TOWER
18
SECOND ST.
301
LEGEND
FORMER UST AREA
N
0
100
200
SCALE IN FEET
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was encountered to depths of approximately 5 feet bgs; coarse sand and gravel to approximately 25 feet bgs; and stiff, tannish white clay was encountered at depths greater than 25 feet bgs. All borings were terminated in the stiff clay layer (WR-ALC, 1990).

2.3 SITE HYDROGEOLOGY

No monitoring wells were installed during the site characterization investigation of the former UST at Building 173. Soil borings advanced to depths of approximately 25 feet bgs did not encounter groundwater. Boring logs from the installation of monitoring wells in the vicinity of Building 173 in December 1986 and January 1987 indicate that saturated soils were encountered at depths ranging from 27 to 40 feet bgs. The static water level in these wells in April 1987 ranged from approximately 27 to 31 feet below ground surface.

In July 1995, groundwater samples were collected at the site using a Geoprobe® environmental sampling rig. Groundwater level readings taken in the temporary Geoprobe® sampling locations and in existing wells in the area indicated a groundwater flow direction to the east-northeast. On site, the groundwater table was encountered at depths ranging from 38 to 39 feet bgs.

2.4 PREVIOUS INVESTIGATIONS

2.4.1 UST Removal: 1989

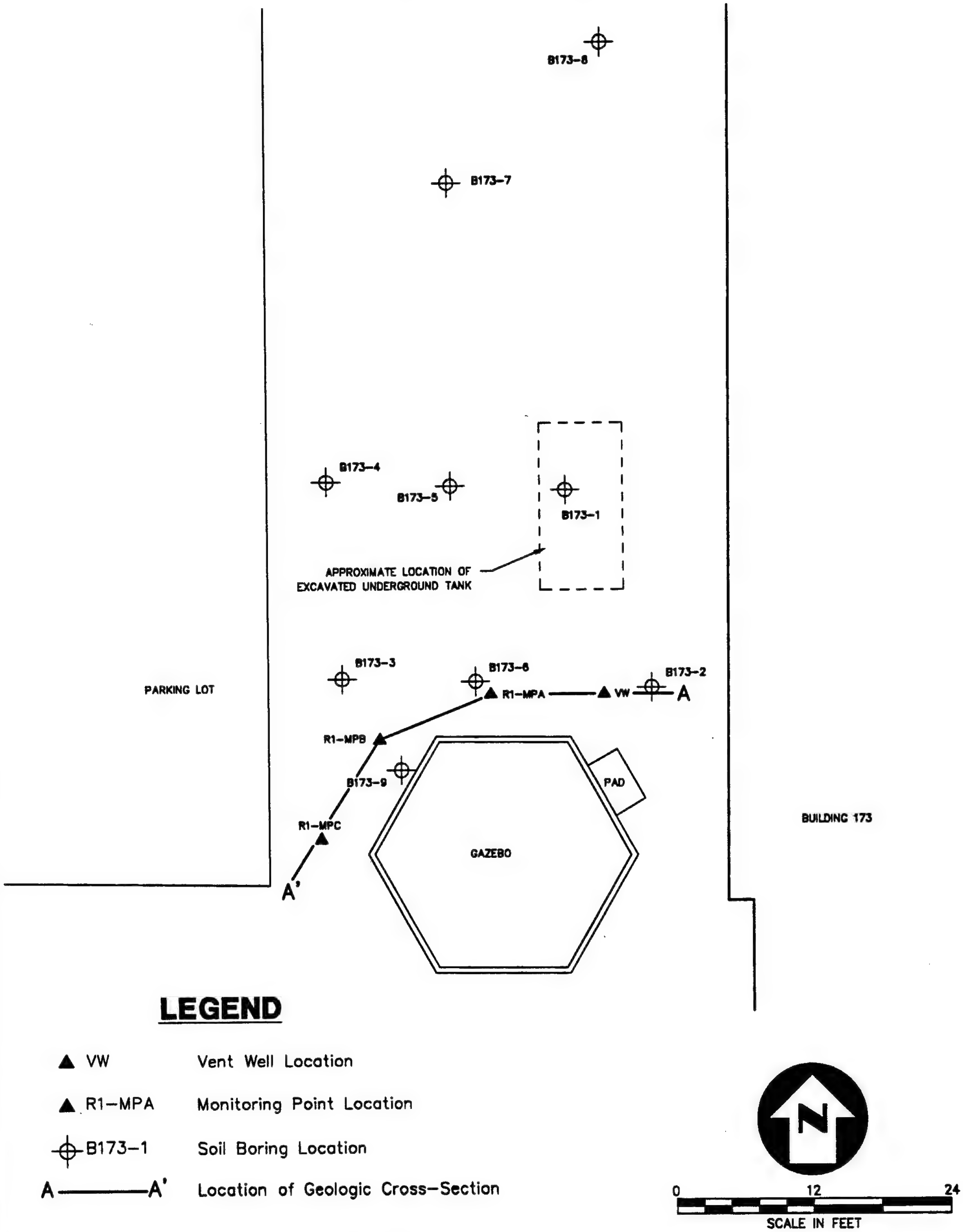
The 1,500-gallon diesel UST at Building 173 was discovered in September 1989, and excavated and removed in October 1989. Upon discovery, the tank was full of water with a small amount of light non-aqueous phase liquid (LNAPL) floating on the water (WR-ALC, 1990). At least one soil sample was collected during the tank removal effort. Analysis of this sample indicated the presence of hydrocarbons at a concentration over 12,000 milligrams per kilogram (mg/kg) as total petroleum hydrocarbons (TPH) {WR-ALC, 1989}.

2.4.2 Site Characterization Investigation: 1990

A site characterization investigation was initiated in January 1990 to confirm the presence of hydrocarbons in the subsurface soils at the site. Nine soil borings were advanced to depths of 25 feet bgs in the area of the former UST at Building 173 (Figure 2.3). Soil samples were collected from seven of the nine borings and were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX). Four samples were collected from boring B173-1, located through the center of the former tank pit. Samples were collected at 5-foot intervals beginning at 8.5 feet bgs. Samples were collected from six of the eight remaining borings (one sample per boring) at depths ranging from 8.5 to 15 feet bgs.

The cleanup level of 20 mg/kg for BTEX (as specified in the Georgia UST regulations in force during the investigation) was exceeded in one sample submitted for analysis. This sample (173-B1-2) was collected from boring B173-1 at a depth of 8.5 to 10 feet bgs. Xylenes were present in the sample at a concentration of 89.42 mg/kg. Benzene, toluene, and ethylbenzene concentrations in sample 173-B1-2 were below detection limits. Soil boring sample results are summarized in Table 2.1.

SOIL BORING, VENT WELL, AND MONITORING POINT LOCATION MAP
BUILDING 173 - FORMER DIESEL UST SITE
ROBINS AFB, GEORGIA



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2.4.3 Re-Excavation and Backfill: 1992

Re-excavation of the tank pit and surrounding soil was performed at the site in March 1992 to remove hydrocarbon-impacted soils from the site. During excavation activities, soils were screened with an organic vapor analyzer to determine the extent of contamination. Approximately 200 cubic yards of contaminated soil were removed from the site and disposed of at Button Gwinnett Landfill in Lawrenceville, GA. Contaminated soil on the south end of the excavation could not be removed without undermining the foundation of the gazebo located on site.

Nine soil samples were collected from the excavation pit, 2 from the excavation floor and 7 from the excavation side walls. BTEX and TPH concentrations exceeded clean up levels specified in the Georgia UST regulations in force during the investigation (20 mg/kg and 100 mg/kg, respectively) in two of the sidewall samples (#6 and #7) collected at the south end of the excavation. BTEX was detected in sample #6 and #7 at concentrations of 258.17 mg/kg and 46.95 mg/kg, respectively. The TPH concentrations in sample #6 and #7 were 22,600 mg/kg and 3,670 mg/kg, respectively. TPH also exceeded clean up levels in the two samples collected from the tank bed. Sample #1 had a TPH concentration of 122 mg/kg and sample #2 had a TPH concentration of 187 mg/kg. Soil sampling results are summarized in Table 2.2.

2.4.4 Bioventing: 1992-1996

Beginning in August 1992, Battelle conducted bioventing pilot testing activities at the site of the former diesel fuel UST at Building 173. As part of the test, one vent well (VW) and three monitoring points (MPs) were installed at the site. VW and MP locations are shown in Figure 2.3 and in the cross section on Figure 2.4. Two soil samples were collected from the VW borehole and one soil sample was collected from R1-MPA. Detailed pilot testing procedures and results are presented in the Interim Report for Bioventing Field Initiative at Robins AFB, GA (Battelle, 1993). Results of the soil samples collected during the installation of the VW and MP borings indicated total BTEX concentrations ranging from 0.0037 mg/kg to 3.33 mg/kg. TPH concentrations in the soil samples ranged from 8 mg/kg to 5,700 mg/kg. Soil gas analysis indicated concentrations of total BTEX ranging from 0.244 parts per million volume per volume (ppmv) to 2.54 ppmv and TPH concentrations ranging from 27 ppmv to 300 ppmv (Table 2.3). The respiration test conducted at the site indicated relatively low oxygen utilization and carbon dioxide production rates. The biodegradation rates measured at the site were fairly consistent between monitoring points, with rates ranging from 0.38 to 0.75 milligrams of TPH degraded per kilogram of soil per day (mg/kg/day) based on oxygen utilization and from 0.31 to 0.68 mg/kg/day based on carbon dioxide production, with a good correlation between the oxygen utilization and carbon dioxide production rates. The soil gas permeability and radius of influence tests were inconclusive. Battelle selected an air blower which would provide an injection flow rate of 12 cubic feet per minute (cfm).

Air injection at the Building 173 former diesel UST site began in September 1992. Soil gas samples collected in May 1994 showed decreases in TPH and total BTEX concentrations. TPH concentrations decreased by 99.9 percent in VW and in R1-MPA at a depth of 21.8 feet bgs (R1-MPA-21.8) and by 95 percent in R1-MPC-15.0. TPH concentrations decreased in the VW from 300 ppmv to 0.27 ppmv; from 290 ppmv to 1.7

Table 2.1
Soil Sample Analytical Results - January 1990
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

Sample ID	Depth (ft)	Benzene (mg/kg)[1]	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
173-B1-2	8.5-10	ND(2)	ND	ND	89.42
173-B1-3	13.5-15	ND	0.51	0.22	0.11
173-B1-4	18.5-20	ND	0.24	ND	0.13
173-B1-5	23.5-25	ND	ND	ND	ND
173-B2-3	13.5-15	ND	ND	ND	ND
173-B4-3	13.5-15	ND	ND	ND	ND
173-B5-2	8.5-10	ND	0.23	0.53	0.27
173-B6-2	8.5-10	ND	ND	ND	ND
173-B8-3	13.5-15	ND	0.22	ND	0.43
173-B9-3	13.5-15	ND	0.20	0.52	0.27

(1) - mg/kg - milligrams per kilogram.
(2) - ND - not detected above laboratory detection limits. Detection limits are unknown.

Source: Battelle, 1992.

Table 2.2
Soil Analytical Results - March 1992
Building 173 - Former Diesel UST Site
Robins AFB, GA

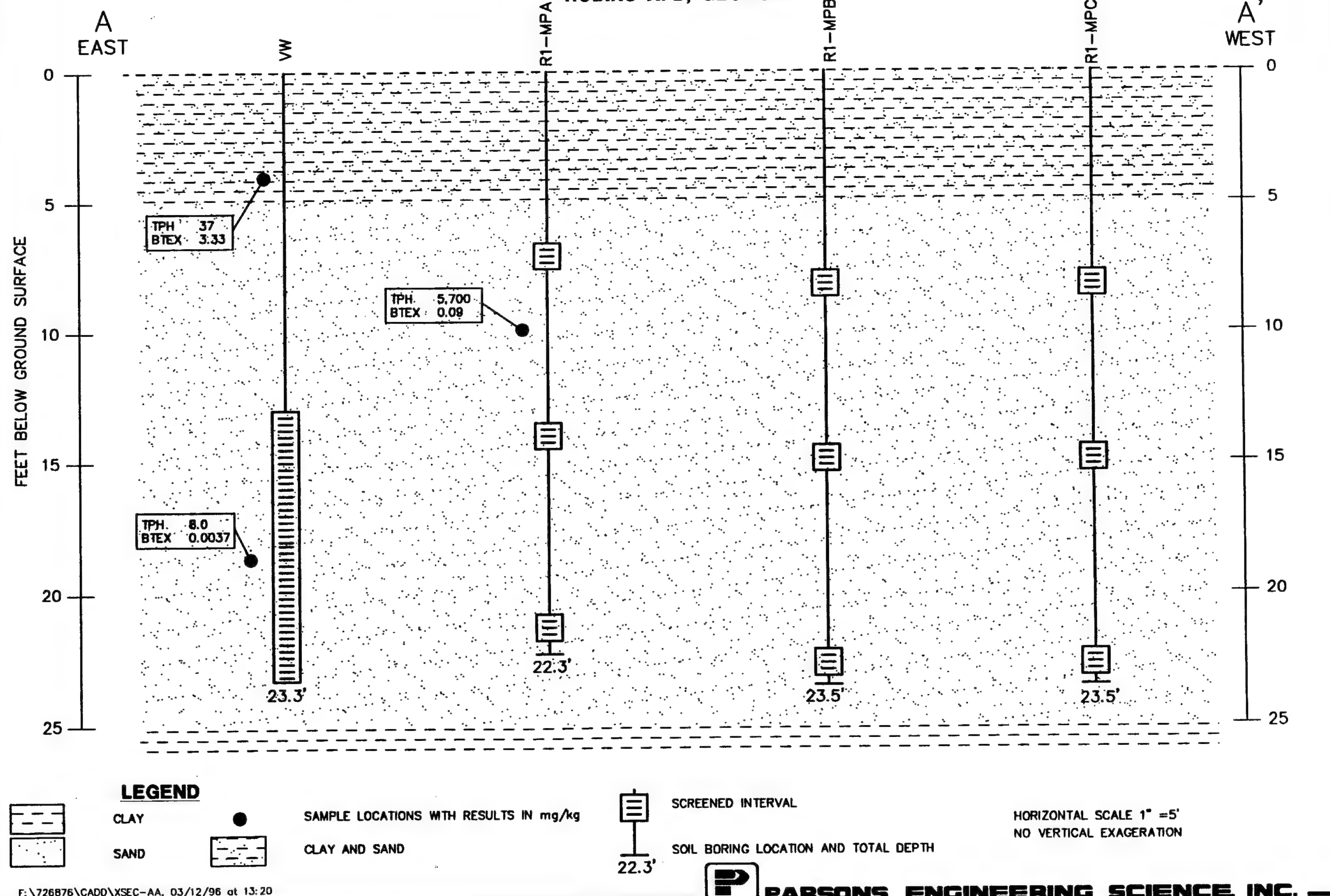
Sample Number	Sample Depth (ft)	TPH[1] (mg/kg)[2]	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	BTEX[3] (mg/kg)
1	8	122	<0.010	<0.010	<0.010	<0.020	<0.05
2	8	187	<0.010	<0.040	<0.010	<0.020	<0.08
3	8	50	<0.010	<0.020	<0.010	<0.020	<0.06
4	8	34	<0.010	<0.020	<0.010	<0.020	<0.06
5	8	41	<0.010	<0.020	<0.010	<0.020	<0.06
6	8	22,600	<0.10	1.87	17.30	239.00	258.17
7	8	3,670	<200	0.60	3.05	43.30	46.95
8	8	24	<0.010	<0.020	<0.010	<0.020	<0.06
9	8	29	<0.010	<0.040	<0.010	<0.020	<0.08

(1) - TPH - total petroleum hydrocarbons.
(2) - mg/kg - milligrams per kilogram.
(3) - Sum of benzene, toluene, ethylbenzene, and xylene components.

Source: Battelle, 1992.

Figure 2.4

GEOLOGIC CROSS-SECTION A-A'
BUILDING 173 - FORMER DIESEL UST SITE
ROBINS AFB, GEORGIA



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ppmv in R1-MPA-21.8; and from 27 ppmv to 1.4 ppmv in R1-MPC-15.0. Initial total BTEX concentrations measured in the soil gas samples collected in August 1992 were relatively low. Soil gas samples collected in May 1994 showed a decrease in total BTEX in the VW from 2.54 ppmv to below detection limits; from 0.917 ppmv to 0.126 ppmv in R1-MPA-21.8; and from 0.244 ppmv to 0.212 ppmv in R1-MPC-15.0.

Total BTEX concentrations in soil samples collected in June 1995 showed little variation from those collected in August 1992. Initial total BTEX concentrations were 3.33 mg/kg (VW-4.0), 0.0037 mg/kg (VW-18.5), and 0.09 mg/kg (R1-MPA-8.5). Samples collected in June 1995 had total BTEX concentrations of 4.2 mg/kg (VW-4.0), below detection limits (VW-18.5), and 0.36 mg/kg (R1-MPA-8.5). TPH concentrations in VW-18.5 decreased from 8.0 mg/kg to below the detection limit. In R1-MPA-8.5, TPH concentrations decreased from 5,700 mg/kg to 48.1 mg/kg. The TPH concentration in the soil sample collected from VW-4.0 increased from 37 mg/kg to 968 mg/kg. This increase in concentration may be attributable to spatial variations in TPH concentrations in the soil. A comparison of soil and soil gas analytical results from August 1992 and June 1995 is presented in Table 2.3.

Because of the relatively low initial TPH and BTEX concentration at the former diesel UST site, and the effects of the bioventing system, it is expected that the site has been remediated to within regulatory cleanup levels. It is anticipated that BTEX and polynuclear aromatic hydrocarbon (PAH) concentrations are below GA EPD Soil Threshold Levels (STLs). Therefore, it is anticipated that the results of the site closure soil sampling described in Section 4 will support site closure.

2.4.5 Groundwater Investigation

The GA EPD letter to Col. Marshall of Robins AFB, dated December 21, 1994, stated that three monitoring wells were required to check the remediation progress at Building 173 UST removal site. Permission was granted to Robins AFB by the GA EPD to use Geoprobe® sample locations instead of installing permanent monitoring wells.

In July 1995, three groundwater samples were collected from the three Geoprobe® sampling locations at the site (Figure 2.5). Groundwater samples were collected from depths ranging from 44 to 48 feet bgs and analyzed by an on-site laboratory for volatile organic compounds (VOCs). Samples for TPH analysis were shipped off-site to Pace Laboratories for analysis. BTEX constituents in each of the groundwater samples collected were below the allowable Federal maximum contaminant levels (MCLs) for drinking water. TPH was below the detection limit in each of the groundwater samples analyzed. A duplicate sample for VOCs was sent to Pace Laboratories for analysis and results indicated BTEX constituents were below detection limits.

Table 2.3
Soil and Soil Gas Sample Results
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

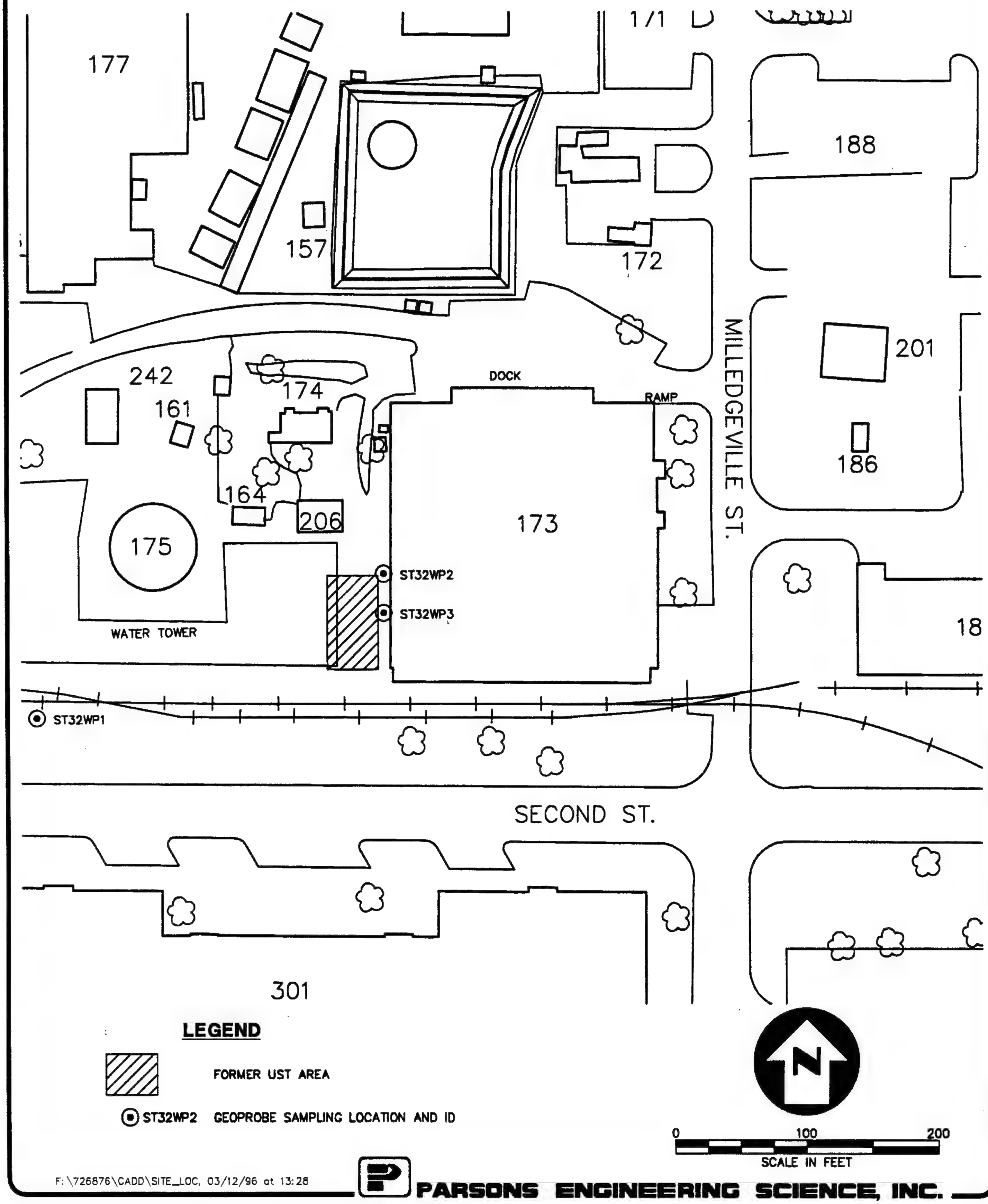
Analyte (units)	Sample Location: VW Aug-92	VW May-94	MPA-21.8' Aug-92	MPA-21.8' May-94	MPC-15.0' Aug-92	MPC-15.0' May-94
Hydrocarbons in Soil Gas						
TPH[1] (ppmv)[2]	300	0.27	290	1.7	27	1.4
Benzene (ppmv)	<0.0040	<0.0020	<0.0020	0.067	<0.0020	0.19
Toluene (ppmv)	0.025	<0.0020	0.052	0.02	0.0060	0.012
Ethylbenzene (ppmv)	0.31	<0.0020	0.055	<0.0020	0.14	<0.0020
Xylenes (ppmv)	2.2	<0.0020	0.81	0.039	0.098	0.01
BTEX (ppmv)	2.535	<0.0080	0.917	0.126	0.244	0.212
	VW-4.0' Aug-92	**VW-4.0' Jun-95**	**VW-18.5' Aug-92**	**VW-18.5' Jun-95**	**MPA-8.5' Aug-92**	**MPA-8.5' Jun-95**
Hydrocarbons in Soil						
TPH (mg/kg)[3]	37	968	8.0	<9.97	5,700	48.1
Benzene (mg/kg)	<0.29	<0.050	<0.00070	<0.050	<0.00070	<0.049
Toluene (mg/kg)	<0.33	<0.050	<0.00080	<0.050	0.0020	<0.049
Ethylbenzene (mg/kg)	0.33	2.4	<0.00060	<0.050	0.0090	<0.049
Xylenes (mg/kg)	3	1.8	0.0037	<0.13	0.0790	0.36
BTEX[4] (ppmv)	3.3	4.2	0.0037	<0.28	0.09	0.36

(1) - TPH - total petroleum hydrocarbons.
(2) - ppmv - parts per million, volume per volume.
(3) - mg/kg - milligrams per kilogram.
(4) - Sum of benzene, toluene, ethylbenzene, and xylenes components.

Source: Battelle, 1995.

Figure 2.5

GEOPROBE SAMPLING LOCATIONS - GROUNDWATER
BUILDING 173 - FORMER DIESEL UST SITE
ROBINS AFB, GEORGIA



3. SITE CLOSURE REQUIREMENTS

In January 1995, the Georgia Rules for Underground Storage Tank Management (Amended) were adopted by the Board of Natural Resources of the State of Georgia. These rules were filed in the office of the Secretary of State on or about February 1, 1995 and became effective 20 days after the filing date. The GUST Rules provide assessment and corrective action guidance, including numerical cleanup goals, for sites that contain or have contained an UST.

3.1 SITE CLOSURE REQUIREMENTS

In the GA EPD guidance document entitled, "So You Want to Close An UST?" site-specific criteria for obtaining "No Further Action Required (NFAR) Status" are provided. NFAR status can be achieved if the analytical results, from samples taken prior to or following excavation, indicate one of the following:

- BTEX, PAHs, and TPH are below laboratory detection limits (BDL) in the soil; or
- BTEX and PAHs are BDL in the soil and TPH in soil is vertically delineated to BDL above the groundwater table; or
- BTEX and PAHs are above detection limits in the soil but below Table A Soil Threshold Levels listed in the GUST Rules and TPH in soil is BDL or is vertically delineated to BDL above the groundwater table; or
- BTEX and PAHs are above detection limits but below Table B Soil Threshold Levels listed in the GUST Rules, a water supply survey indicates that there are no potential receptors within the applicable radii, and TPH in soil is BDL or is vertically delineated to BDL above the groundwater table; or
- BTEX and PAHs are less than Table A Soil Threshold Levels listed in the GUST Rules, TPH is not vertically delineated to BDL above the groundwater table because groundwater is encountered in the boring or the excavation, and the water sample does not contain BTEX or PAHs above Federal or State MCLs; or
- BTEX and PAHs are less than Table B Soil Threshold Levels listed in the GUST Rules, TPH is not vertically delineated to BDL above the groundwater table because groundwater is encountered in the boring or the excavation, the water sample does not contain BTEX or PAHs above In-Stream Water Quality Standards, and the water supply survey indicates that there are no water supplies within the applicable radii.

The proposed sampling and analysis program includes soil sample analysis for BTEX, PAHs, and TPH, and groundwater sample analysis for BTEX and PAHs. Based on analytical results from previous investigations, it is anticipated that the NFAR status requirements will be achieved through satisfaction of one or both of the following NFAR scenarios:

- BTEX and PAHs are above detection limits in the soil but below Table A Soil Threshold Levels listed in the GUST Rules and TPH in soil is BDL or is vertically delineated to BDL above the groundwater table; or
- BTEX and PAHs are less than Table A Soil Threshold Levels listed in GUST Rules, TPH is not vertically delineated to BDL above the groundwater table because groundwater is encountered in the boring or the excavation, and the water sample does not contain BTEX or PAHs above Federal or State MCLs.

3.2 STATE SOIL THRESHOLD LEVELS

Soil Threshold Levels (STLs) for petroleum-impacted sites are specified for BTEX and PAH constituents and determine whether a site enters corrective action based on soil analytical results. STLs vary depending on the geographic location of the site within the State and the distance to the nearest groundwater withdrawal point or surface water body. Geographically, UST Site 173 is located within the Average or Higher Groundwater Pollution Susceptibility Area. A public water supply well, located approximately 120 feet northwest of the site, is the nearest groundwater withdrawal point. Based on these conditions, the STLs presented in Table 3.1 are applicable.

3.3 STATE MAXIMUM CONTAMINANT LEVELS IN DRINKING WATER

The applicable groundwater quality standards for the 173 UST Site are State or Federal MCLs for drinking water. The GUST Rules specify that BTEX and PAH concentrations in groundwater should not exceed the applicable State MCLs for sites located within 500 feet of a public water supply withdrawal point. The State and Federal MCLs for BTEX and PAH compounds are listed in Table 3.2. If BTEX and PAH concentrations in groundwater are less than or equal to the State or Federal MCLs, the site closure requirement for groundwater will be satisfied.

Table 3.1
Applicable Soil Threshold Levels[1]
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

Parameter	**Average or Higher Groundwater Pollution Susceptibility Area [2]**
	≤500 ft to withdrawal Point
Volatile Organic Compounds (mg/kg)[3]	
Benzene	0.005
Toluene	0.400
Ethylbenzene	0.370
Xylenes (total)	20.00
Polynuclear Aromatic Hydrocarbons (mg/kg)	
Acenaphthene	NA[4]
Anthracene	NA
Benz(a)anthracene	NA
Benzo(a)pyrene	0.660
Benzo(b)fluoranthene	0.820
Benzo(g,h,i)perylene	NA
Benzo(k)fluoranthene	1.60
Chrysene	0.660
Dibenz(a,h)anthracene	1.50
Fluoranthene	NA
Fluorene	NA
Indeno(1,2,3-c,d)pyrene	0.660
Naphthalene	NA
Phenanthrene	NA
Pyrene	NA

(1) - As specifed in Table A of GUST Rule 391-3-15-.09.
(2) - Where public water supplies exist within 2.0 miles and/or non-public supplies exist within 0.5 miles. Based on an assumed distance of 0.5 feet between contaminated soils and the water table.
(3) - mg/kg - milligrams per kilogram.
(4) - NA - not applicable. The health-based threshold level exceeds the expected soil concentration under free product conditions.

Table 3.2
State and Federal Maximum Contaminant Levels
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

Parameter	**State Maximum Contaminant Level[1] (mg/L)[3]**	**Federal Maximum Contaminant Level[2] (mg/L)**
Volatile Organic Compounds		
Benzene	0.005	0.005
Toluene	1.0	1
Ethylbenzene	0.7	0.7
Xylenes (total)	10.0	10
Polynuclear Aromatic Hydrocarbons		
Acenaphthene	NA[4]	NA
Anthracene	NA	NA
Benz(a)anthracene	NA	NA
Benzo(a)pyrene	0.0002	0.0002
Benzo(b)fluoranthene	NA	NA
Benzo(g,h,i)perylene	NA	NA
Benzo(k)fluoranthene	NA	NA
Chrysene	NA	NA
Dibenz(a,h)anthracene	NA	NA
Fluoranthene	NA	NA
Fluorene	NA	NA
Indeno(1,2,3-c,d)pyrene	NA	NA
Naphthalene	NA	NA
Phenanthrene	NA	NA
Pyrene	NA	NA

(1) - GA EPD, 1994. Rules for Safe Drinking Water, Chapter 391-3-5-.18, March.
(2) - USEPA, 1995. Drinking Water Regulations and Health Advisories. May.
(3) - mg/L - milligrams per liter.
(4) - NA - not applicable. No MCL has been established.

4. SITE CLOSURE SAMPLING AND ANALYSIS PLAN

The following SAP describes the borehole locations, soil and groundwater sampling procedures, and analytical methods proposed to collect sufficient data to support site closure. This plan has been prepared and will be implemented by, or under the direct supervision of, a Georgia Professional Geologist as required by the GUST Rules.

4.1 BOREHOLE INSTALLATION AND SOIL SAMPLING

4.1.1 Proposed Borehole Locations

As described in Section 2, this site was characterized during several past site investigations. Sampling results during excavation activities indicated that BTEX and TPH contamination was present in the soils on the south end of the excavation along the sidewalls at depths of approximately 8 ft bgs. TPH contamination was also present in the two tank bed samples collected at depths of approximately 15 ft bgs during excavation activities and in the soil boring sample collected from a depth of 8.5 to 10 feet bgs. Parsons ES proposes to advance six additional boreholes. The locations of the proposed borings are presented in Figure 4.1. One borehole will be advanced in the area of the former UST location; one will be advanced next to the existing VW; one will be advanced next to monitoring point R1-MPA; and one will be advanced between monitoring points R1-MPB and R1-MPC (see Figure 4.1). The remainder of the borings will be located as to delineate the lateral extent of hydrocarbons in the soil. Borings will be terminated above the groundwater table at a depth of approximately 35 feet. A copy of the borehole advancement logs will be retained onsite for review by the base point-of-contact.

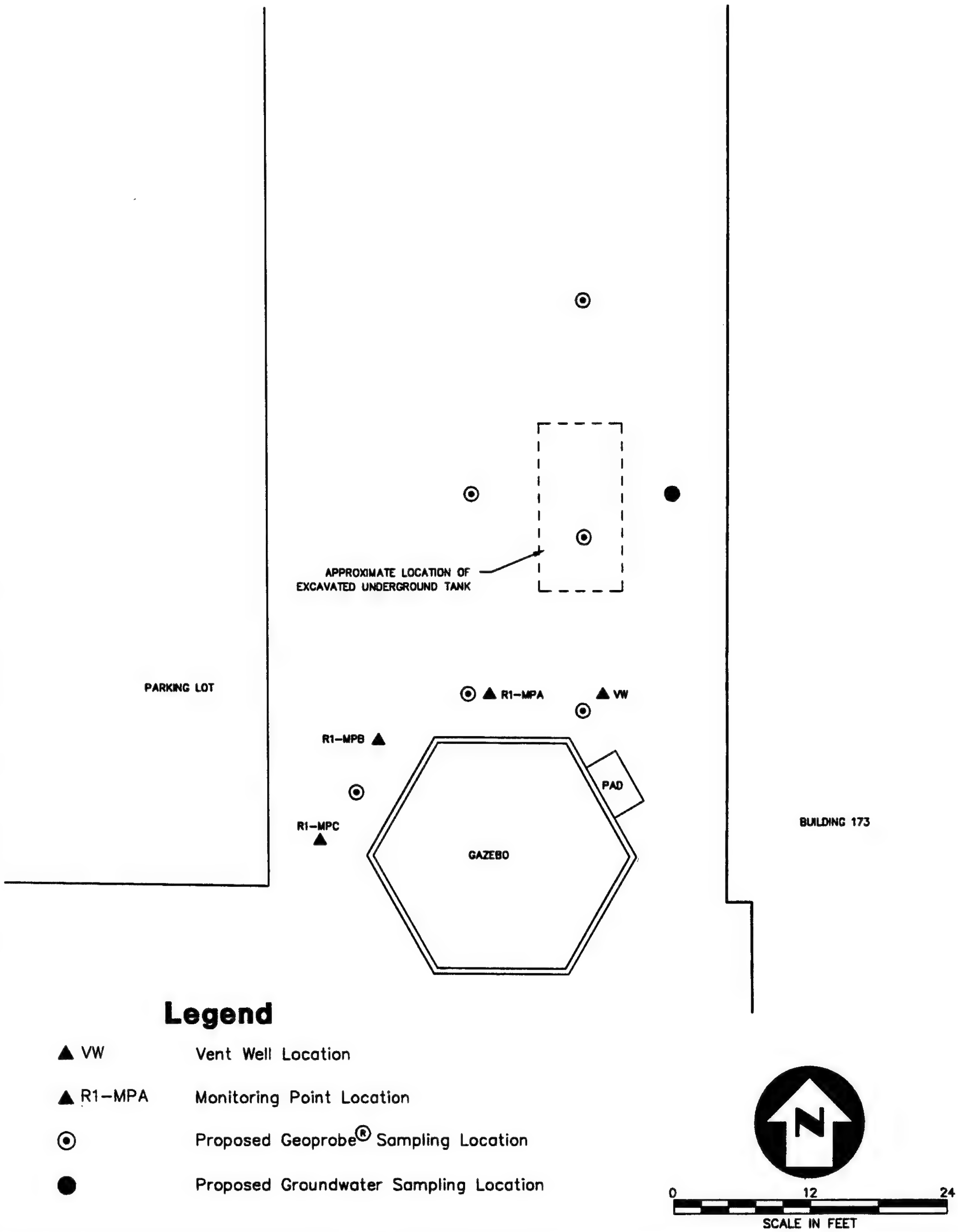
4.1.2 Soil Sample Collection

Soil samples will be collected at 5-foot intervals from each boring for headspace screening, lithologic description, and chemical analysis. Boreholes will be advanced using a Geoprobe® sampling rig. Soil samples will be collected using direct-push methods with hollow soil sampling barrels. The sample barrel will be lined with an acetate liner. The lined sampler will be driven the length of the barrel or until sampler refusal. Upon retrieval of the filled sampler, the liner will be removed and the ends will be covered with Teflon® sheeting, then sealed with plastic caps.

A small section of the retrieved soil core will be used for lithologic characterization and headspace screening. A portion of the soil in the liner will be placed in a Ziploc® bag for headspace screening. Boreholes will be logged by a Parsons ES geologist. Soil types will be classified according to the Unified Soil Classification System (USCS) and described in accordance with the standard Parsons ES soil description format.

The headspace analysis portion of the sample will be allowed to equilibrate for approximately 10 minutes. The bag will then be pierced with the detector probe of the photoionization meter and a headspace reading will be taken and recorded on the boring log. Headspace readings will be used to evaluate the relative concentration of

PROPOSED SOIL BORING LOCATIONS
BUILDING 173 - FORMER DIESEL UST SITE
ROBINS AFB, GEORGIA



Legend

▲ VW — Vent Well Location

▲ R1-MPA — Monitoring Point Location

⊙ — Proposed Geoprobe® Sampling Location

● — Proposed Groundwater Sampling Location

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hydrocarbons in the soil samples and aid in laboratory sample selection. A total of 12 soil samples (2 samples per boring) will be submitted for laboratory analysis. From each boring, the sample exhibiting the maximum headspace reading will be selected for laboratory analysis. The second sample for laboratory analysis will be selected by the field geologist and will be from either the bottom of the boring or depth ranges sampled in previous investigations.

4.1.3 Soil Sample Analysis

Proposed sample analytical methods and detection limits are presented in Table 4.1. All samples will be analyzed by a State of Georgia-certified and AFCEE-approved Laboratory.

Parsons ES proposes to analyze soil samples by EPA Method SW8020 for BTEX, by EPA Method SW8310 for PAHs, and by EPA Method 8015 for TPH (diesel range organics) in accordance with GA EPD guidelines (GA EPD, 1995b).

4.2 GROUNDWATER SAMPLING

This section describes groundwater sample collection using the Geoprobe® apparatus and laboratory analysis. One groundwater sample will be collected immediately east of the former tank pit (See Figure 4.1) and used to investigate groundwater quality in the surficial aquifer.

4.2.1 Groundwater Sample Collection

The Geoprobe® system is a hydraulically powered percussion/probing machine used to advance sampling tools through unconsolidated soils. This system provides for the rapid collection of groundwater grab samples at shallow depths while minimizing the generation of investigation-derived waste materials.

The sampling depth and interval will be specified prior to driving the Geoprobe® pushrod into the ground. The Parsons ES field scientist will verify the sampling depth by measuring the length of each pushrod prior to insertion into the ground. A drive tip fitted with a slotted steel screen will be placed on the tip of the pushrod, and the rod will be pushed into the ground using the Geoprobe® apparatus. After reaching the desired depth, the pushrod will be raised 1 to 2 feet to expose the screen and to allow water to percolate into the end of the hollow pushrod. Water samples will be collected from water entering the downhole, slotted end of the pushrod through the screen with a peristaltic pump or bailer apparatus.

After sampling is complete, the sampling location will be restored as closely to its original condition as possible. The hole created by the Geoprobe® in sandy soils tends to cave in soon after extraction of the drive sampler. However, if the test hole remains open after extraction of the Geoprobe® rod it will be sealed with bentonite chips, pellets, or grout to eliminate any creation or enhancement of contaminant migration pathways to the groundwater.

Table 4.1
Laboratory Analytical Methods and Detection Limits
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

EPA Analytical Method	Project Reporting Limit for Soil (mg/kg)[1]	Project Reporting Limit for Groundwater (µg/L)[2]
EPA SW8020 (BTEX)[3]		
Benzene	0.001	2
Toluene	0.002	2
Ethylbenzene	0.002	2
Xylenes	0.002	2
EPA SW8310 (PAHs)[4]		
Acenaphthene	1.2	18
Anthracene	0.44	0.6
Benz(a)anthracene	0.009	0.13
Benzo(a)pyrene	0.015	0.12
Benzo(b)fluoranthene	0.012	0.18
Benzo(g,h,i)perylene	0.05	0.76
Benzo(k)fluoranthene	0.011	0.17
Chrysene	0.1	1.5
Dibenz(a,h)anthracene	0.02	0.3
Fluoranthene	0.14	2.1
Fluorene	0.14	2.1
Indeno(1,2,3-c,d)pyrene	0.03	0.43
Naphthalene	1.2	18
Phenanthrene	0.42	6.4
Pyrene	0.18	2.7
EPA SW8015 (TPH - DRO)[5][6]	10	NA[7]

(1) - mg/kg - milligrams per kilogram.
(2) - µg/L - micrograms per liter.
(3) - Benzene, toluene, ethylbenzene, and total xylenes.
(4) - PAH - Polynuclear aromatic hydrocarbons.
(5) - TPH - Total petroleum hydrocarbons.
(6) - DRO - Diesel range organics.
(7) - NA - Not Applicable.

4.2.2 Groundwater Sampling

This section describes groundwater sampling. The following steps will be taken during sampling:

1) All purging and sampling equipment will be decontaminated as outlined in Subsection 4.4.2.
2) The Geoprobe® sampling point will be purged by bailing or by pumping using a peristaltic pump. Except as noted below, at least three casing volumes shall be removed from the sampling point before it is sampled. The casing volume is defined as the volume of submerged sampling point casing.
3) The temperature, pH, and specific conductivity of the groundwater will be measured and recorded after removing each casing volume during purging. The sample may be collected after three casing volumes have been removed and the temperature, pH, and conductivity have stabilized. Stabilization is defined as follows: temperature ± 1° C, pH ± 0.1 units, and conductivity ± 5 percent. If these parameters do not stabilize, the sample will be taken after six casing volumes have been removed. The total number of casing volumes removed will be recorded.
4) Samples will be collected as soon as possible after purging the well. When a sampling point is pumped dry before three casing volumes have been removed, the sample will be collected as soon as a sufficient amount of fluid has reentered the sampling point.
5) Samples to be analyzed for volatile constituents will be collected with a decontaminated stainless steel or Teflon® bailer, with a new nylon cord attached. The nylon cord will be used once and discarded. Care will be taken when lowering the bailer not to agitate the water surface. If conditions permit, peristaltic pump equipped with new high density polyethylene (HDPE) tubing will be used to collect the groundwater samples. The HDPE tubing will be used once and discarded. The water sample will be carefully transferred into sample bottles containing the appropriate preservatives. Volatile organics samples will be taken from the bailer first. The filled vials will be inverted and tapped lightly to locate air bubbles. If air bubbles are observed in the VOC sample, the top 10% of the sample may be refilled up to three attempts. A new vial containing fresh preservative will be used thereafter.
6) The remaining sample containers will be filled by collecting water with a bailer (or with a peristaltic pump) and pouring equal aliquots of the water into each sample until all containers are full.
7) Groundwater sampling data will be recorded in the field notebook or groundwater sampling form.

4.2.3 Groundwater Sample Analysis

Proposed sample analytical methods and detection limits are presented in Table 4.1. All samples will be analyzed by a State of Georgia-certified and AFCEE-approved Laboratory.

Parsons ES proposes to analyze the groundwater sample by EPA Method SW8020 for BTEX, and by EPA Method SW8310 for PAHs in accordance with GA EPD guidelines (GA EPD, 1995b).

4.3 QUALITY CONTROL SAMPLES

Four types of field quality control (QC) samples will be collected during this investigation. Descriptions of each sample type, as well as the frequency of collection, are summarized in Table 4.2.

4.4 EQUIPMENT DECONTAMINATION

All equipment (Geoprobe®, sampling, etc.) will be cleaned prior to entering Robins AFB property and prior to leaving the Robins AFB to ensure that no contaminants enter or leave the Base due to activities included in this investigation. To prevent potential cross-contamination of samples during the sampling process, all sampling tools and probing equipment will be decontaminated prior to site mobilization and before each sample collection. Equipment to be decontaminated will include, probe rods, sample barrels, the Geoprobe® rig as deemed necessary by the site geologist or engineer, sampling devices, and instruments. Field team members will take care to prevent samples from coming into contact with potentially contaminating substances such as tape, oil, engine exhaust, corroded surfaces, and dirt.

All on-site decontamination will be done in a staging area and field personnel will wear clean vinyl gloves during the process. Care will be taken when choosing the site of the staging area to avoid fugitive dust, fuel, oils, gasoline, organic solvents or any potential airborne source of contamination. All decontamination activities will be recorded in the field log book.

For heavily contaminated equipment, a methanol rinse or hexane rinse can be used before regular decontamination procedures. If equipment cannot be cleaned, it will be disposed of properly. If new equipment such as sample barrels and probe rods have been painted at the factory, this paint will be removed before use.

4.4.1 Downhole Equipment

Before use and between boreholes, sample barrels and other downhole equipment will be cleaned to prevent cross-contamination. Cleaning will be accomplished using a high-pressure water wash, followed by a potable water rinse. Decontamination fluids will be collected and contained in labeled 55-gallon drums.

4.4.2 Sampling Equipment

All sampling equipment will be decontaminated including stainless steel bowls, sample barrels, hand augers, bailers, submersible pumps, tubing, field instruments, and water level indicators. The procedures to be used depend on the equipment materials (e.g., glass, Teflon® or stainless steel) as well as the analyses to be conducted on the sample (e.g., metals, organics).

TABLE 4.2
Field QC Samples
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

Type	Use	Definition	Frequency
Trip Blank	Water and/or soil VOC analyses	A trip blank sample is designed to detect contamination of environmental samples during transport from the field to the lab. A trip blank is a VOC sample bottle filled in the laboratory with Type II Reagent Grade Water, transported to the site, handled like a sample, and returned to the laboratory for analysis. Trip blanks shall not be opened in the field. The trip blank for soils is the same as for water samples.	One trip blank shall accompany every cooler of soil and water samples sent to the laboratory for the analysis of VOCs. This blank shall be analyzed for VOCs only. (A total of 3 trip blanks are proposed for this site)
Equipment Blank	Water and Soil Samples	An equipment blank is designed to detect contamination of environmental samples caused by contamination of sampling equipment. An equipment blank is analyte free water that is poured into or pumped through the sampling device, transferred to a sample bottle, and transported to a laboratory for analysis.	One equipment blank shall be taken on each media. (A total of 2 rinsates are proposed for this site)
Field Duplicate	Water Samples	A field duplicate is a sample collected independently from another environmental sample, but taken at the same sampling location and at the same sampling event. The field duplicate is designed to check variability arising from sampling activities or lack of sample homogeneity.	Ten percent of all water samples shall be field duplicates. Both duplicates (e.g., the sample and the duplicate) shall be analyzed for the same parameters in the laboratory. (A total of 1 field duplicate is proposed for this site)

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TABLE 4.2 - Continued
Field QC Samples
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

Type	Use	Definition	Frequency
Field Replicate	Soil Samples	A field replicate is a single sample divided into two equal parts for analysis. Replicates are often called "splits". Field replicates are designed to check variability arising from sampling activities or lack of sample homogeneities.	Ten percent of all soil and ten percent of all sediment samples shall be field replicates. Both replicates (e.g., the sample and the replicate) shall be analyzed for the same parameters in the laboratory. (A total of 2 field replicates are proposed for this site)

For decontaminating *glass or Teflon® sampling equipment:*

- Wash and scrub with a laboratory grade non-phosphate detergent (Liquinox® or laboratory grade equivalent) or Alconox® and water;
- Rinse with tap water;
- Rinse with deionized water;
- Rinse with pesticide grade isopropanol;
- Air dry;
- Wrap in oil-free aluminum foil if equipment is to be stored or transported.

Stainless steel equipment such as sample barrels, bowls, and purging equipment is decontaminated in the same manner as the glass or Teflon® equipment.

Decontamination fluids resulting from on-site decontamination will be collected and transported to the Access Road decon pad (located east of the site on Second Street) for disposal. The base point-of-contact will be notified before disposal. Any deviations from the standard decontamination protocols will be noted in the field log book.

4.5 WASTE HANDLING

Wastes that are anticipated to be generated on-site include soil cuttings, sample remnants, purge water, decontamination fluids, disposable protective clothing and sampling/packaging materials. Parsons ES will follow the methods described in this section, along with the Robins AFB Investigation Derived Waste Management Plan, for handling these wastes.

4.5.1 Sample Remnants and Soil Sampling Cuttings

Soil cuttings generated during soil sampling will be placed in US Department of Transportation (DOT)-approved, 55-gallon drums. The drums will be labeled with the site name, sampling date, borehole number, and depth intervals. To minimize cuttings disposal costs, cuttings showing no field evidence of contamination will not be drummed with contaminated cuttings (i.e., soil with above-background PID readings, petroleum odor, or discoloration). Analytical data from the samples sent to the laboratory will be used to determine proper disposal methods. Parsons ES will arrange transport of the drums. Proper disposal of residuals confirmed as contaminated waste will be coordinated by Parsons ES.

4.5.2 Purging Fluids

Water discharges associated with well purging will be containerized. The Base point-of-contact will be notified of the location of the drums, and Parsons ES will arrange for the transport of the drums to the Access Road decon pad for temporary storage pending analytical results. The analytical results for the groundwater sample obtained from the sampled well will be used to determine proper disposal of the containerized water. Disposal of the purge water may be discharged to the Robins AFB Industrial Waste Water Treatment Plant (IWWTP), pending approvals of an IWWTP representative.

4.5.3 Decontamination Fluids

Decontamination fluids from heavy equipment (e.g., Geoprobe® rig equipment) may be directly discharged to an approved sanitary sewer system from the Access Road decon pad or transported to the base industrial wastewater treatment plant, pending approval of the base point-of-contact. Parsons ES will coordinate the transport and disposal activity. Residual quantities of pesticide grade solvents (isopropanol) remaining on decontaminated sampling equipment or collected in a dedicated container will be allowed to volatilize to the atmosphere. Large quantities will be containerized for disposal.

4.6 WELL ABANDONMENT

If site closure is granted by Georgia EPD, the existing VW and MPs will be abandoned in accordance with guidance provided in the Georgia EPD Manual for Groundwater Monitoring (GA EPD, 1991). The general procedure for abandonment of shallow wells includes the three steps described below.

1. Removal of obstructions in the well that could interfere with the plugging operation and thorough flushing of the well to purge residual drilling fluids and other fine detritus;
2. Removal of the well casing (where practical) to ensure placement of an effective seal - as a minimum when the casing is not properly grouted, the upper 20 feet of casing must be removed; and
3. Sealing of the well with an impermeable filler such as neat cement.

4.7 DEMOBILIZATION

Prior to demobilization, a walk-through of the site will be conducted by Parsons ES and the base point-of-contact to ensure cleanup and site restoration has been achieved.

5. SITE CLOSURE REPORT FORMAT

Following receipt of the laboratory analytical results, a report will be prepared and submitted to the Georgia Department of Natural Resources Environmental Protection Division, Robins AFB, and AFCEE.

It is anticipated that the soil and groundwater analytical results will be below the State action levels. The report will be presented as a Site Closure Report and will be prepared in accordance to the Closure Report Form (GA EPD, 1995b). The report will be prepared under the direction of a Georgia Professional Geologist and will contain the following information at a minimum:

- Site figures showing final borehole locations;
- Summary of field activities;
- Assessment of analytical results in comparison to State criteria;
- Laboratory analytical reports and chain-of-custody forms;
- Borehole logs; and
- Conclusions and recommendations.

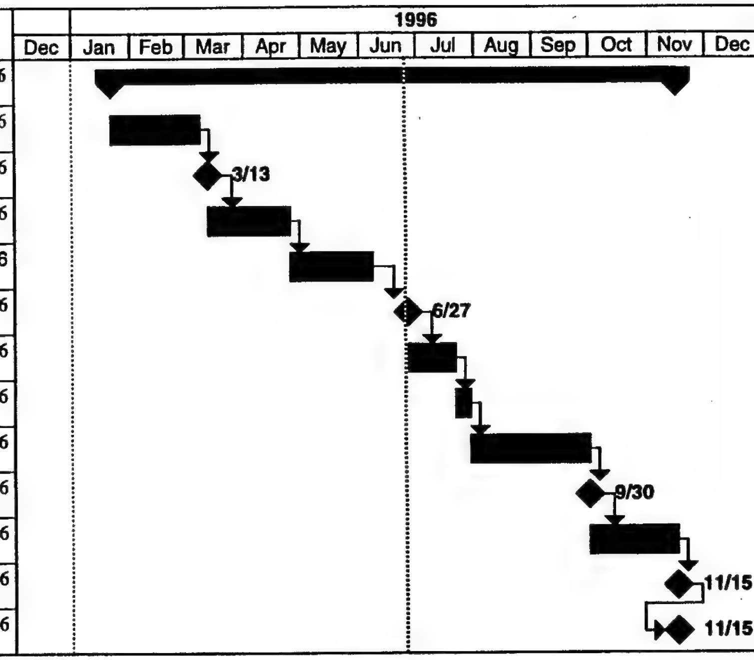
In the unlikely event that the soil and/or groundwater analytical results exceed the applicable State action levels, the report will be presented as a Site Investigation Summary Report and recommendations for further remedial action will be provided.

6. PROJECT SCHEDULE

The overall schedule for completing the tasks described in this SAP is presented in Figure 6.1. The schedule includes activities through the completion of the final Closure Sampling report. Field work will begin upon approval of the final SAP by Robins AFB and AFCEE.

Schedule of Activities
Building 173 - Former Diesel UST Site
Robins AFB, Georgia

ID	Task Name	Duration	Start	Finish
1	**Building 173 - Former Diesel UST Site 173**	215d	1/22/96	11/15/96
2	Draft SAP Preparation	35d	1/22/96	3/8/96
3	Deliver Draft SAP to AFCEE and Robins AFB	0d	3/13/96	3/13/96
4	Review and Comment	31d	3/13/96	4/24/96
5	Regulatory Review	32d	4/25/96	6/7/96
6	Deliver Final SAP to AFCEE and Robins AFB	0d	6/27/96	6/27/96
7	Field Mobilization	17d	6/27/96	7/21/96
8	Field Sampling	6d	7/22/96	7/29/96
9	Draft Report Preparation	45d	7/30/96	9/30/96
10	Deliver Draft Report to AFCEE and Robins AFB	0d	9/30/96	9/30/96
11	Review and Comment	34d	10/1/96	11/15/96
12	Deliver Final Report to AFCEE, Robins AFB, and GA EPD	0d	11/15/96	11/15/96
13	Project Complete	0d	11/15/96	11/15/96



Project:
Date: 6/25/96

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress

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7. SITE MANAGEMENT

This section identifies the primary site contacts, necessary Base support, and contingency plans involved with site management.

7.1 CONTACTS

Prior to initiation of the field effort, the Parsons ES Project Manager (PM) will contact the AFCEE contact to plan a schedule for field activities. The location of soil borings will be discussed with the Base contact in order to minimize the disruption of Base activities and to determine the locations of underground utilities in the vicinity of the site.

The primary contacts are as follows:

Personnel	Phone Number	Responsibility
Captain Ed Marchand	(210) 536-4364	AFCEE Contact
Mr. Dale Fox	(912) 926-0983	Robins AFB Contact
Mr. Fred Otto	(912) 926-0983	Robins AFB Geologist
SSgt. Lemuel Campbell	(912) 926-0983	Robins AFB Project Inspector
Mr. John Ratz	(303) 831-3100	Parsons ES Project Manager
Mr. Steve Ratzlaff	(404) 235-2361	Parsons ES Site Manager

The Parsons ES Site Manager will serve as the primary Parsons ES contact for personnel coordination. However, field team leader, appointed by the Parsons ES Site Manager, may also be responsible for arranging site access.

7.2 BASE SUPPORT

The Base will provide the following support during field activities:

- **Provide Site Access to Field Team Members.** The Base contact will ensure daily access to the site through arrangements with Robins AFB Security Personnel.
- **Coordinate Badge and Vehicle Passes.** The base point-of-contact will coordinate with Robins AFB Security Personnel for the issue of personnel badges and vehicle passes for each field team member. AFMC Form 496, Application for AFMC Identification Card will be completed by the Parsons ES field team members. Each field team member will be provided with a badge and vehicle pass (if needed) as well as a letter stating the purpose of the sampling effort.
- **Provide Scheduling Information.** The Base point of contact will notify Parsons ES of any Base activities which may adversely affect field activities and/or impact the sampling schedule.

- **Provide Base Notification.** The Base point of contact should ensure that all pertinent parties (e.g., industrial shop personnel, military police, Base Commander's Office) are notified in advance of the drilling and sampling activities.
- **Provide Water Hook-ups and a Central Decontamination Area.** In order to provide water for the purpose of drilling, decontamination, and personnel/equipment cleanup, the Base point of contact will arrange for access to a potable water supply at the site or on the Base. In addition, the Base will provide a convenient paved decontamination area for cleaning heavy equipment. A 110/115 VAC electrical outlet must be available within 100 feet of the paved area for high pressure washer hookup. Non-hazardous water wastes from the decontamination area will be transported to the Access Road decon pad for temporary storage pending coordination of discharge to the base industrial wastewater treatment plant. A site-specific decontamination area will also be established at the site for smaller equipment, instrument, and personnel decontamination.
- **Provide Access to Office Equipment.** Parsons ES will need access to a class A telephone (with long distance capability) and a copy machine to allow for efficient copying of chain-of-custody records and other field forms, as well as distribution of any memos to ensure site coordination.
- **Assign Accumulation Points.** Any drilling cuttings or well purge fluids generated from the site work that are suspected of being hazardous will be moved to predesignated accumulation points to be disposed of by the Base.
- **Provide Underground Utility Clearance/Digging Permits.** Before any work, each proposed location must be checked for underground utilities by Base personnel or utility representatives, or both. The base point-of-contact will ensure that field team has an approved AF Form 103, the Base Civil Engineering Work Request Form, before drilling. A copy shall be kept at the site where the drilling work will be conducted. The field crew will request clearance of locations at least one week before commencement of intrusive site work. The Base will issue digging or other appropriate permits prior to commencement of drilling operations.

7.3 CONTINGENCY PLANS

This subsection describes steps which will be taken by Parsons ES to minimize delays during the investigations. Potential problems which could be encountered during the field effort include:

- Access/coordination difficulties;
- Equipment breakdowns;
- Conflicts with planned sampling locations; and/or
- Abnormal site conditions. (i.e., heavy rain, thunderstorm, etc.).

- Digging/Excavation Permit delays

7.3.1 Access/Coordination Contingencies

Anticipated support needs were outlined in Section 7.2. In the event that site access difficulties arise, the Base point of contact will be contacted to resolve the problem. The Base point of contact will also be notified if additional support needs are identified during the field effort. The Parsons ES Site Manager and field team leader will be responsible for notifying the Base point of contact and/or other designated personnel (e.g., designated site escorts/contacts) of access or coordination difficulties.

7.3.2 Equipment Contingencies

In the event of operation and maintenance problems with the instruments, the following procedures will be followed:

- Contact the Field Team Leader;
- Refer to the instrument's instruction book for troubleshooting procedures; and
- Contact the manufacturer and/or supplier.

If necessary, backup instruments will be obtained. However, any such decisions must be made by the Parsons ES Site Manager, after consideration of other potential solutions. Equipment will be maintained and extra batteries will be carried in order to avoid downtime due to minor problems.

7.3.3 Sampling Location Contingencies

During the field effort, certain chosen sampling locations may be inaccessible due to site conditions. When the conditions can be adjusted (e.g., unlocking a gate or moving a vehicle), the Parsons ES Site Manager and/or field team leader will contact the Base point-of-contact and/or site escort to arrange for access to the sampling location. When the sampling location remains inaccessible (e.g., due to overhead wires or underground cables), a sample will be taken as close as possible to the designated location. If all areas in the vicinity of the sampling location are affected, the Parsons ES Site Manager or Parsons ES Project Manager will contact the AFCEE contact to revise the sampling strategy.

7.3.4 Abnormal Site Condition Contingencies

If abnormal site conditions are encountered which adversely affect site activities, the following procedures will be followed:

- The Base point-of-contact will be notified of the conditions (e.g., Base mowing grass, unexpected construction).
- If the abnormal site conditions cannot be altered, an alternative sampling site will be selected.
- If the abnormal site conditions affect all sampling locations and/or if moving to another sampling site will adversely impact the project schedule

or cost, both the Base point-of-contact and the AFCEE contact will be notified. A decision will then be made as to the best course of action which will ensure quality project completion in a timely and cost efficient manner. Abnormal or unanticipated site conditions which adversely affect personnel health and safety are to be covered in the project Health and Safety Plan.

7.3.5 Digging/Excavation Permit Delays

To ensure digging/excavation permits are issued prior to the planned digging/excavation date, the following base procedure will be followed:

Digging permits (AF Form 103) are obtained at 0800 Monday mornings, only, in Building 272. The Contractor, along with the technical representative, shall meet with Civil Engineering utility personnel at this time to make all necessary arrangements for the excavation permit before any digging. The Contractor will be given instructions on how to prepare and properly complete an AF Form 103. This includes coordination before beginning any work involving digging/excavation and location of buried structures and utility lines. Before getting signatures, a drawing will be provided indicating the full extent of digging/excavation (width/depth/length of trench or hole). Civil Engineering utility personnel will meet with the Contractor at the site and locate their underground utility lines and buried structures that might be affected by any digging/excavation. No digging will be allowed until the permit is approved by all parties (three day maximum). The digging/excavation permit shall be effective only for the time period indicated by the final signature authority. Recoordination of the AF Form 103 with all organizations and the technical representative shall be required for any additional time required after expiration of the original time period. No digging/excavation shall be done after 1600 hours on weekdays or anytime on weekends unless prior approval is obtained.

7.3.6 Site Health and Safety Plan

Parsons ES will provide a Health & Safety Plan (under separate cover) to the base point-of-contact for review prior to mobilizing to the Robins AFB. The plan will include the following information:

- Provide an index of all hazardous materials to be introduced to the site;
- Plan for protecting personnel and property during the transport, storage and use of the materials;
- Procedures for spill response and disposal;
- MSDSs for materials listed in the index of the plan and not required in the technical section of the Closure Sampling and Analysis Plan;
- Approved labeling system to identify contents on all containers on site; and
- Personnel training plan.

7.4 CONTROL AND DISPOSAL OF SOLID WASTES

Solid wastes generated during the field effort will be picked up and placed in covered approved containers. The containers will be moved to a pickup point or disposal area, as

directed by the base point-of-contact. The containers will be regularly emptied throughout the duration of the field effort. When handling and disposing of wastes, care will be taken to prevent contamination of the site or other areas.

Precautions will be taken to prevent spills of oil and hazardous material. In the event of a spill, the base point-of-contact will be notified immediately. Spill response shall be in accordance with 40 CFR 300 and applicable state regulations.

7.5 BASE PERSONNEL BADGES AND VEHICLE PASSES

Parsons ES will provide a completed AFMC Form 496 (1 original and 1 copy) and a letter with the following information through the base point-of-contact to 78 SPS/SPOS (62068):

- Letter on company letterhead;
- List of all employees including sub-contractors;
- Sample signatures for personnel authorized to sign AFMC Form 496 (Application for Contractor ID Credential);
- Contract Number;
- List endorsed by a company representative and the base Contracting Officer;
- Start and Stop Dates for the Contract; and
- If 5 or more company vehicles will be used at the site, a list will be prepared documenting proof of ownership, year, make, and tag number.

8. REFERENCES

Battelle. 1992. *Test Plan and Technical Protocol for a Field Treatability Test for Bioventing.* Prepared for U.S. Air Force Center for Environmental Excellence. January.

Battelle. 1993. *Interim Report for Bioventing Field Initiative at Robins Air Force Base, Georgia.* March.

Georgia Department of Natural Resources Environmental Protection Division (GA EPD). 1991. Manual for Groundwater Monitoring. July.

Georgia Department of Natural Resources Environmental Protection Division (GA EPD). 1994. *Rules for Safe Drinking Water (Revised).* March.

Georgia Department of Natural Resources Environmental Protection Division (GA EPD). 1995a. *Georgia Rules for Underground Storage Tank Management (Amended).* February.

Georgia Department of Natural Resources Environmental Protection Division (GA EPD). 1995b. *So You Want to Close an UST? --Petroleum Releases-- (GUST-9).* August.

Warner Robins Air Logistics Center (WR-ALC). 1989. *Letter to Marlin R. Gottschalk of the Underground Storage Tank Unit of the Georgia Department of Natural Resources.* November 14.

Warner Robins Air Logistics Center (WR-ALC). 1990. *Initial Site Characterization of Tank 173-1 Site, Robins AFB, Georgia.* July 23.

United States Environmental Protection Agency (USEPA) Office of Water. 1995. *Drinking Water Regulations and Health Advisories.* May.

APPENDIX A
HEALTH AND SAFETY PLAN ADDENDUM

HEALTH AND SAFETY PLAN ADDENDUM

CLOSURE SOIL SAMPLING
BUILDING 173 - FORMER DIESEL UST SITE
ROBINS AIR FORCE BASE, GEORGIA

JUNE 1996

Prepared By

PARSONS ENGINEERING-SCIENCE, INC.
ATLANTA, GEORGIA

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HEALTH AND SAFETY PLAN ADDENDUM
CLOSURE SOIL SAMPLING

BUILDING 173 - FORMER DIESEL UST SITE

ROBINS AIR FORCE BASE, GEORGIA

Prepared By

ENGINEERING-SCIENCE, INC.
57 EXECUTIVE PARK SOUTH, N.E.
SUITE 500
ATLANTA, GEORGIA

REVIEWED AND APPROVED BY:

	Name	Date
Project Manager	[signature]	6/14/96
Parsons ES Health and Safety Officer	[signature]	6/26/96

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PROJECT CONTACTS

Parsons ES

Site Manager	Mr. Steve Ratzlaff Telephone: (404) 235-2300
Project Manager:	Mr. John Ratz Telephone: (303) 831-8100
Parsons ES Technical Director:	Mr. Doug Downey Telephone: (303) 831-8100
Parsons ES Site Health & Safety Officer:	Mr. Steve Ratzlaff Telephone: (404) 235-2300
Corporate Health & Safety Officer:	Edward Grunwald, C.I.H Telephone: (404) 235-2394

AFCEE

Contact:	Captain Ed Marchand Telephone: (210) 536-4364

Robins AFB

Contact:	Mr. Dale Fox Telephone: (912) 926-0983

EMERGENCY CONTACT SHEET

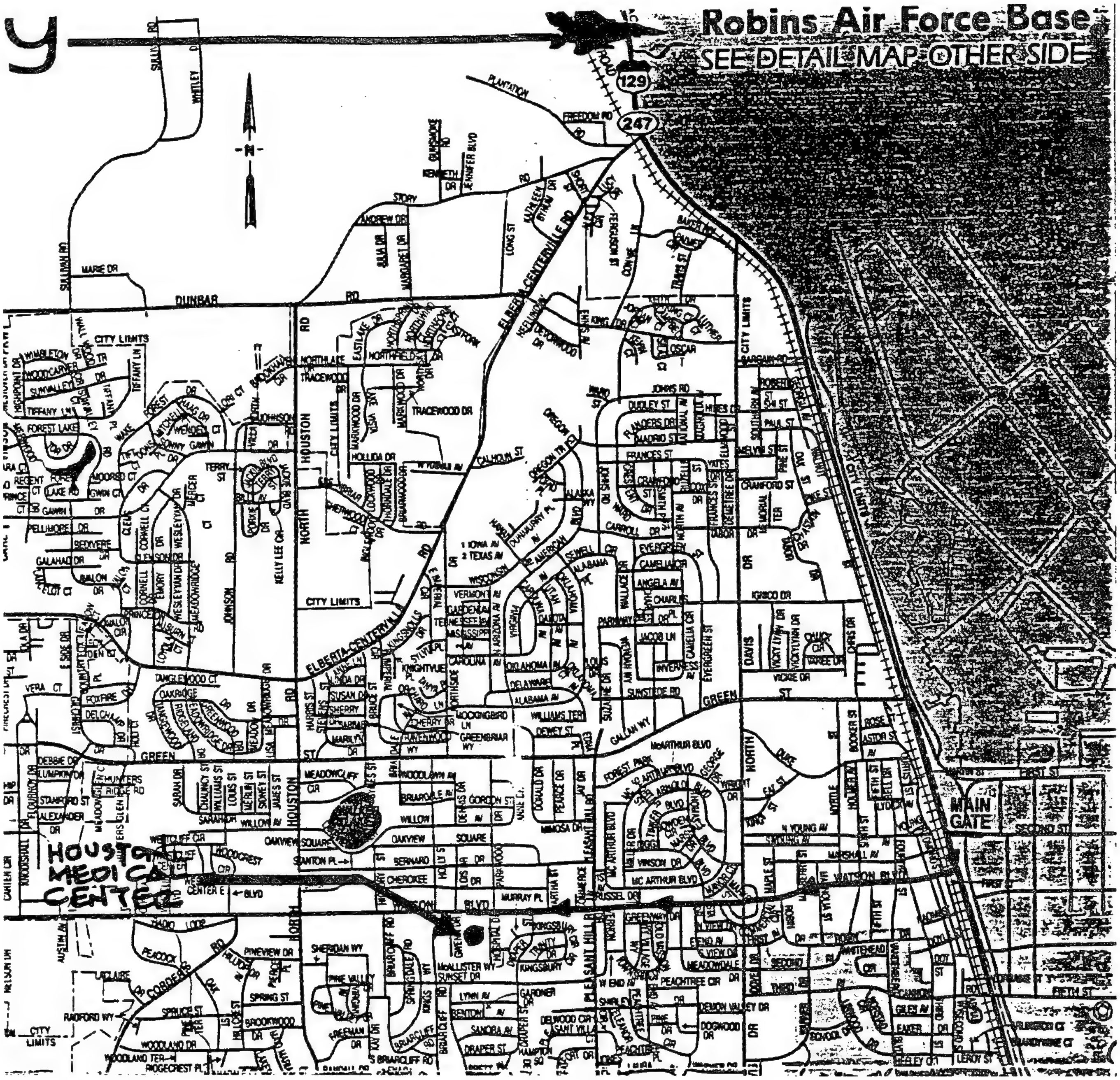
In the event of any situation of unplanned occurrence requiring assistance, the appropriate contact(s) should be made from the list below. For emergency situations, contact should first be made with the site coordinator who will notify emergency personnel who will then contact the appropriate response teams. The emergency contact list must be posted at the site.

Contingency Contacts	Phone Number
Base Fire Department	(912) 926-3487
Police Department	911

<u>Medical Emergency</u>

Nearest Hospital:	Houston Medical Center
Phone No.:	(912) 542-7800
Address:	1601 Watson Blvd. Warner Robins, GA
Travel Time from Site:	10 - 15 minutes
Map to Hospital and Written Directions	see next page - iii
Ambulance	911

MAP TO HOSPITAL



Route to Hospital:

Exiting from the Second Street Gate, turn left on to Highway 247. Turn right at the first light (Watson Boulevard). Drive west on Watson Boulevard for approximately two (2) miles. Houston Medical Center will be on the left.

CLOSURE SOIL SAMPLING
BUILDING 173 - FORMER DIESEL UST SITE
SITE SPECIFIC HEALTH AND SAFETY INFORMATION

1.0 PURPOSE AND POLICY

The purpose of this document is to identify site specific health and safety information to be used during the Closure Sampling at Building 173 Former Diesel UST Site. The site specific information discussed in this document will be used in conjunction with the health and safety policies, practices, and procedures outlined in the attached *Program Health and Safety Plan for Extended Bioventing,* (Parsons ES, 1995).

2.0 SITE DESCRIPTION

Building 173 is the former location of a 1,500 gallon diesel underground storage tank (UST). The UST was used to store diesel fuel for use in emergency power generators. The UST was located on the west side of Building 173, in the area just north of an existing gazebo. The UST was abandoned in place approximately 22 years ago and was excavated and removed in October 1989. Soil samples collected from the excavation after the removal of the tank indicated the presence of petroleum hydrocarbon constituents.

Additional site characterization work was performed at the site in 1990 and 1992. The purpose of the investigations were to determine the extent of petroleum hydrocarbon contamination to the surrounding media. Results of the investigation confirmed the presence of hydrocarbons in the soil. Approximately 200 cubic yards of contaminated soil was removed from the excavation area and disposed of at Button Gwinnett Landfill in Lawrenceville, GA. Contaminated soil on the south end of the excavation could not be removed without undermining foundation of the gazebo located on site.

To remediate the contaminated soils remaining at the former UST site at Building 173, a bioventing system was installed and system start up was initiated in September 1992. Soil and soil gas samples collected after 3 years of system operation indicate that concentrations of petroleum hydrocarbon constituents have been reduced.

3.0 SCOPE OF WORK

The scope of work for the field activities scheduled at the site consists of the advancement of soil borings, and the collection of soil and groundwater samples for laboratory analysis.

4.0 PROJECT TEAM ORGANIZATION

- Site Manager: Mr. Steve Ratzlaff

- Field Team Leader and Site Health and Safety Officer: Mr. Steve Ratzlaff
- Field Team Members: To be assigned.

4.1 Responsibilities of Project Personnel

The responsibilities of on-site personnel are listed below:

The Site Manager is responsible for the following:

Preparing and organizing the background review of the site.

- Coordinating the preparation and execution of the Work Plan and Health and Safety Plan.
- Preparing and organizing the field team.

The Field Team Leader has the authority to direct operations and site activities. Responsibilities of the Field Team Leader include the following:

Coordinating with Project Health and Safety Officer in determining protection level.

- Enforcing site control.
- Documenting field activities and sample collection.
- Serving as a liaison with site personnel

The responsibilities of the Project Health and Safety Officer include the following:

Periodically inspecting protective clothing and equipment.

- Ensuring that protective clothing and equipment are properly stored and maintained.
- Controlling entry and exit at the access control points.
- Confirming each team member's suitability for work based on a physician's recommendation.
- Monitoring the work parties for signs of stress, such as heat stress and fatigue.
- Implementing the Health and Safety Plan.
- Conducting periodic inspections to determine if the Health and Safety Plan is being followed.

- Knowing emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department and police department.

- Notifying, when necessary, local public emergency officials.

- Coordinating emergency medical care.

- Ensuring that required equipment is available.

- Advising medical personnel of potential exposures and consequences.

- Notifying emergency response personnel by telephone or radio in the event of an emergency.

Project team members involved in this field investigation are responsible for the following:

Taking precautions necessary to prevent injury to themselves and other employees.

- Complying with the Health and Safety Plan and reporting any deviations from this plan to the Field Team Leader.

- Performing only those tasks they believe they can do safely.

- Immediately reporting any accidents and/or unsafe conditions to the Field Team Leader.

5.0 HAZARDOUS MATERIALS MANAGEMENT

5.1 Hazardous Materials Index

The following hazardous materials may be utilized during work activities at the site:

- Methanol (16 liters)

- Isopropanol (16 liters)

Material Safety Data Sheets (MSDS) for these materials are provided in Attachment A.

5.2 Transport, Storage , and Use

The hazardous materials identified in Section 5.1 will be transported and stored in UN certified, Department of Transportation (DOT) approved shipping containers.

These chemicals will be used for decontamination of field instruments, and tools. Decontamination procedures are provided in Section 10 of the Program Health and Safety Plan for Extended Bioventing (Parsons ES, 1995).

5.3 Spill Response and Disposal

In the event of accidental spillage of a hazardous material, listed in Section 5.1, the following procedures will be followed.

1. Evacuate personnel from the immediate spill area;
2. Identify the chemical and the chemical's hazards (refer to MSDS);
3. Determine the appropriate spill clean-up method (vermiculite granules for spills of isopropanol or methanol);
4. Ensure appropriate personal protective equipment is donned;
5. Conduct cleanup of liquid using absorbent materials;
6. Evaluate the media beneath the spill for the presence of the spilled chemical.
7. If impacted media is found, remove the media and ensure proper disposal.

5.4 Chemical Labeling

Bottles of methanol and isopropanol recieved from the chemical supply company will be inspected to ensure that they are labelled. Unlabelled containers will be returned to the suppier. When decontamination sovents are transfered to a nagalene® bottle for temporary use, the nagalene® bottle will be labeled to identify its content. All labels must include the following information:

- The identity of the chemical.
- An appropriate hazard warning (e.g., flammable, skin and eye irritant, ect)
- The name and address of the chemical manufacturer, importer, or other responsible party.

Field personnel handling decontamination solvents must understand the labeling system.

ATTACHMENT A

~~File 1; Entry 1; Accession No. 38840~~

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

M A T E R I A L S A F E T Y D A T A S H E E T

~~24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151~~

I8840 -03 . ISOPROPYL ALCOHOL

~~EFFECTIVE: 09/14/87~~ ISSUED: 10/27/87

==

SECTION I - PRODUCT IDENTIFICATION

==

PRODUCT NAME: ISOPROPYL ALCOHOL
~~FORMULA: CH3CHOHCH3~~
FORMULA WT: 60.10
CAS NO.: 67-63-0
~~NIOSH/RTECS NO.: NT805000~~
COMMON SYNONYMS: 2-PROPANOL; ISOPROPANOL; SEC-PROPYL ALCOHOL; IPA;
DIMETHYLCARBINOL
~~PRODUCT CODES: U298,5082,9080~~

==

PRECAUTIONARY LABELLING

==

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 1 SLIGHT
FLAMMABILITY - 3 SEVERE (FLAMMABLE)
REACTIVITY - 1 SLIGHT
CONTACT - 1 SLIGHT
~~HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).~~

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

PRECAUTIONARY LABEL STATEMENTS

WARNING
FLAMMABLE
~~CAUSES IRRITATION~~
HARMFUL IF SWALLOWED OR INHALED
KEEP AWAY FROM HEAT, SPARKS, FLAME. AVOID CONTACT WITH EYES, SKIN, CLOTHING.
~~AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH~~
ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE,
USE ALCOHOL FOAM, DRY CHEMICAL, CARBON DIOXIDE - WATER MAY BE INEFFECTIVE.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
ISOPROPYL ALCOHOL	90-100	67-63-0

SECTION III - PHYSICAL DATA

BOILING POINT: 83 C (180 F) VAPOR PRESSURE(MM HG): 33

MELTING POINT: -89 C (-128 F) VAPOR DENSITY(AIR=1): 2.1

SPECIFIC GRAVITY: 0.79 (H2O=1) EVAPORATION RATE: 2.83 (BUTYL ACETATE=1)

SOLUBILITY(H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: COLORLESS LIQUID WITH SLIGHT ODOR OF RUBBING ALCOHOL.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP 12 C (53 F) NFPA 704M RATING: 1-3-0

FLAMMABLE LIMITS: UPPER - 12.0 % LOWER - 2.0 %

FIRE EXTINGUISHING MEDIA

USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE.
(WATER MAY BE INEFFECTIVE.)

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.

TOXIC GASES PRODUCED

CARBON MONOXIDE, CARBON DIOXIDE

THRESHOLD LIMIT VALUE (TLV/TWA): 980 MG/M3 (400 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 1225 MG/M3 (500 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 980 MG/M3 (400 PPM)

TOXICITY: LD50 (ORAL-RAT)(MG/KG) - 5045
LD50 (IPR-MOUSE)(MG/KG) - 333
LD50 (SKN-RABBIT) (G/KG) - 13
LD50 (IV-MOUSE) (MG/KG) - 1863

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE

INHALATION OF VAPORS MAY CAUSE HEADACHE, NAUSEA, VOMITING, DIZZINESS, DROWSINESS, IRRITATION OF RESPIRATORY TRACT, AND LOSS OF CONSCIOUSNESS.
INHALATION OF VAPORS MAY CAUSE PULMONARY EDEMA.
LIQUID MAY BE IRRITATING TO SKIN AND EYES. PROLONGED SKIN CONTACT MAY RESULT IN DERMATITIS. EYE CONTACT MAY RESULT IN TEMPORARY CORNEAL DAMAGE.
INGESTION MAY CAUSE NAUSEA, VOMITING, HEADACHES, DIZZINESS, GASTROINTESTINAL IRRITATION.
INGESTION MAY CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION.

TARGET ORGANS

EYES, SKIN, RESPIRATORY SYSTEM, CENTRAL NERVOUS SYSTEM, LUNGS

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

NONE IDENTIFIED

ROUTES OF ENTRY

INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

CALL A PHYSICIAN.
IF SWALLOWED, DO NOT INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

INCOMPATIBLES: STRONG OXIDIZING AGENTS, ALUMINUM, NITRIC ACID, SULFURIC ACID, AMINES AND AMMONIA, HALOGEN ACIDS AND HALOGEN COMPOUNDS, ALDEHYDES

DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SUITABLE PROTECTIVE CLOTHING. SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING, OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D001 (IGNITABLE WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 1000 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.

EYE/SKIN PROTECTION: SAFETY GOGGLES, UNIFORM, APRON, NEOPRENE GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: RED (FLAMMABLE)

SPECIAL PRECAUTIONS

BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME   ISOPROPANOL
HAZARD CLASS   3.2
UN/NA   UN1219
LABELS   FLAMMABLE LIQUID

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND DATA PRESENTED IN VARIOUS TECHNICAL PUBLICATIONS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE. J. T. BAKER MAKES NO WARRANTY OR REPRESENTATION ABOUT THE ACCURACY OR COMPLETENESS NOR FITNESS FOR PURPOSE OF THE INFORMATION CONTAINED HEREIN.

Option? K

CAS NO.: 67-56-1
NIOSH/RTECS NO.: PC1400000
COMMON SYNONYMS: METHYL ALCOHOL; WOOD ALCOHOL; CARBINOL; METHYLOL; WOOD SPIRIT
PRODUCT CODES: 9049,9072,9075,9076,9071,5217,9074,P704,9093,5536,9068,9073 9091,9263,9069,9070,5370,9127

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 3 SEVERE (POISON)
FLAMMABILITY - 3 SEVERE (FLAMMABLE)
REACTIVITY - 1 SLIGHT
CONTACT - 1 SLIGHT
HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
FLAMMABLE
HARMFUL IF INHALED
CANNOT BE MADE NON-POISONOUS
MAY BE FATAL OR CAUSE BLINDNESS IF SWALLOWED
KEEP AWAY FROM HEAT, SPARKS, FLAME. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE ALCOHOL FOAM, DRY CHEMICAL, CARBON DIOXIDE - WATER MAY BE INEFFECTIVE. FLUSH SPILL AREA WITH WATER SPRAY.

SAF-T-DATA(TM) STORAGE COLOR CODE: RED (FLAMMABLE)

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
METHANOL	90-100	67-56-1

SECTION III - PHYSICAL DATA

BOILING POINT: 65 C (149 F) VAPOR PRESSURE(MM HG): 96

MELTING POINT: -98 C (-144 F) VAPOR DENSITY(AIR=1): 1.11

SPECIFIC GRAVITY: 0.79 EVAPORATION RATE: 4.6
(H2O=1) (BUTYL ACETATE=1)

SOLUBILITY(H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID WITH CHARACTERISTIC PUNGENT ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP 12 C (54 F) NFPA 704M RATING: 1-3-0

FLAMMABLE LIMITS: UPPER - 36.0 % LOWER - 6.0 %

FIRE EXTINGUISHING MEDIA

USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE.
(WATER MAY BE INEFFECTIVE.)

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.
BURNS WITH A CLEAR, ALMOST INVISIBLE FLAME.

TOXIC GASES PRODUCED

CARBON MONOXIDE, CARBON DIOXIDE, FORMALDEHYDE

SECTION V - HEALTH HAZARD DATA

TLV LISTED DENOTES (TLV-SKIN).

THRESHOLD LIMIT VALUE (TLV/TWA): 260 MG/M3 (200 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 310 MG/M3 (250 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 260 MG/M3 (200 PPM)

TOXICITY: LD50 (ORAL-RAT)(MG/KG) - 5628
LD50 (IPR-RAT)(MG/KG) - 9540

LD50 (SCU-MOUSE)(MG/KG) - 9800
LD50 (SKN-RABBIT) (G/KG) - 20

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE

INHALATION AND INGESTION ARE HARMFUL AND MAY BE FATAL.

SUFFOCATION, LOWER BLOOD PRESSURE, CENTRAL NERVOUS SYSTEM DEPRESSION.
LIQUID MAY BE IRRITATING TO SKIN AND EYES. PROLONGED SKIN CONTACT MAY RESULT IN DERMATITIS. EYE CONTACT MAY RESULT IN TEMPORARY CORNEAL DAMAGE.
INGESTION MAY CAUSE BLINDNESS.
INGESTION MAY CAUSE NAUSEA, VOMITING, HEADACHES, DIZZINESS, GASTROINTESTINAL IRRITATION, CENTRAL NERVOUS SYSTEM DEPRESSION AND HEARING LOSS.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE KIDNEY AND/OR LIVER DAMAGE.

TARGET ORGANS

EYES, SKIN, CENTRAL NERVOUS SYSTEM, GI TRACT, RESPIRATORY SYSTEM, LUNGS

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

EYE DISORDERS, SKIN DISORDERS, LIVER OR KIDNEY DISORDERS

ROUTES OF ENTRY

INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT, ABSORPTION

EMERGENCY AND FIRST AID PROCEDURES

CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER. INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

INCOMPATIBLES: STRONG OXIDIZING AGENTS, STRONG ACIDS, ZINC, ALUMINUM, MAGNESIUM

DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE, FORMALDEHYDE

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U154 (TOXIC WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 200 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, RUBBER GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: RED (FLAMMABLE)

SPECIAL PRECAUTIONS

BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	METHYL ALCOHOL
HAZARD CLASS	FLAMMABLE LIQUID
UN/NA	UN1230
LABELS	FLAMMABLE LIQUID
REPORTABLE QUANTITY	5000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	METHANOL
HAZARD CLASS	3.2, 6.1
UN/NA	UN1230
LABELS	FLAMMABLE LIQUID, POISON

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

APPENDIX B
BORING LOGS

PARSONS ENGINEERING SCIENCE, INC.
SOIL BORING LOG AND WELL CONSTRUCTION RECORD

Client Robins Air Force Base
Site Building 173 - Former Diesel UST Site
Boring I.D. GP-1
Geologist/Engineer G. Hedrick
Drilling Method Geoprobe
Sampling Method Acetate Liner Sampling Tube
Date Started 7/31/96
Date Completed 7/31/96
Driller Fugro
Borehole Diameter (in) 2.0
Depth Drilled (ft) 40
Ground Elevation (ft) NA
Depth to Water (ft) NA
Date Measured NA

Project I.D. 726876.65122
Well I.D. NA
Date Installed NA
Date Grouted NA
Casing Material NA
Screen Material NA
Casing Interval (ft) NA
Screened Interval (ft) NA
Sump Installed? NA
Well Depth (ft) NA
TOC Elevation (ft) (msl) NA
Water Lvl. from TOC (ft) NA
Date Measured NA

DEPTH (feet)	SAMPLE	BLOWS/6 IN	% REC.	HNu/OVA (ppm)	LITHOLOGIC DESCRIPTION	SOIL CLASS	GRAPHIC LOG	WELL DIAGRAM
0		NA	50	1.0	SAND and SILT, fine, brown, damp.	SM		
		NA	100	1.2	SAND and CLAY, fine, pale brown, damp.	SC		
5		NA	100	2.6	SAND, fine, some Clay, yellowish red, moist.			
		NA	100	2.0	SAND, fine to coarse, little Clay, yellowish red, moist.	SW		
		NA	100	2.5	CLAY, little Sand, fine, gray to reddish yellow, damp.	CH		
10		NA	100	1.8	SAND, fine to medium, yellowish red, damp.	SW		
		NA	100	2.6	SAND, medium to coarse, trace Clay, reddish yellow, damp.			
15		NA	100	3.0	SAND, medium to coarse, trace Clay, reddish yellow, damp.			
		NA	20	2.0	SAND, fine to coarse, little Clay, reddish yellow, damp.			
		NA	100	2.0	SAND, medium to very coarse, reddish yellow, damp.			
20		NA	40	2.4	SAND, fine to medium, little Clay, brown, moist.			
		NA	100	2.5	SAND, medium to very coarse, reddish yellow, moist.			
25		NA	100	2.2	24-25'- SAND, fine to coarse, reddish yellow, moist. 25-26'- CLAY. pale red, moist.	CL		
		NA	100	2.8	26-27.5'- CLAY, pale red to gray, damp. 27.5-28'- SILT, some Clay, white, damp.	CL ML		
		NA	100	3.2	CLAY, some Silt, gray, moist.			
30								

T-WRAP

PARSONS ENGINEERING SCIENCE
SOIL BORING LOG AND WELL CONSTRUCTION RECORD

Client Robins Air Force Base
Site Building 173 – Former Diesel UST Site
Boring I.D. GP-1
Geologist G. Hedrick

Project I.D. 726876.65122
Well I.D. NA
Date Installed NA

DEPTH (feet)	SAMPLE	BLOWS/6 IN	%REC.	HNu/OVA (ppm)	LITHOLOGIC DESCRIPTION	SOIL CLASS	GRAPHIC LOG	WELL DIAGRAM
30	X	NA	100	1.8	CLAY, some Silt, gray, moist.	CL ML		
	X	NA	100	2.8	32-33'- SILT, gray, moist. 33-34'- SILT and SAND, fine, gray, moist.	ML SM		
35	X	NA	100	2.0	SAND, fine to medium, little Silt, gray, moist.	SW		
	X	NA	100	1.6	CLAY, little Silt, gray, moist.	CH		
	X	NA	100	NA	38-38.5'- SILT, gray, wet. 38.5-40'- SAND, fine, little Silt, yellowish brown, wet.	ML SW		
40					Boring Terminated 40 feet below ground surface.			
45								
50								
55								
60								
65								

PARSONS ENGINEERING SCIENCE, INC.
SOIL BORING LOG AND WELL CONSTRUCTION RECORD

Client Robins Air Force Base
Site Building 173 – Former Diesel UST Site
Boring I.D. GP-2
Geologist/Engineer G. Hedrick
Drilling Method Geoprobe
Sampling Method Acetate Liner Sampling Tube
Date Started 7/31/96
Date Completed 7/31/96
Driller Fugro
Borehole Diameter (in) 2.0
Depth Drilled (ft) 40
Ground Elevation (ft) NA
Depth to Water (ft) NA
Date Measured NA

Project I.D. 726876.65122
Well I.D. NA
Date Installed NA
Date Grouted NA
Casing Material NA
Screen Material NA
Casing Interval (ft) NA
Screened Interval (ft) NA
Sump Installed? NA
Well Depth (ft) NA
TOC Elevation (ft) (msl) NA
Water Lvl. from TOC (ft) NA
Date Measured NA

DEPTH (feet)	SAMPLE	BLOWS/6 IN	% REC.	HNu/OVA (ppm)	LITHOLOGIC DESCRIPTION	SOIL CLASS	GRAPHIC LOG	WELL DIAGRAM
0		NA	90	1.4	SAND and CLAY, fine, yellowish red, dry.	SC		
		NA	100	1.0	SAND and SILT, fine, little Clay, yellowish red, dry.	SM		
5		NA	100	0.8	SAND, fine to medium, some Clay, yellowish red, damp.	SC		
		NA	100	170	CLAY, some Sand, fine to medium, gray, damp, hydrocarbon odor.			
		NA	100	2.4	SAND, fine to medium, some Clay, yellow, damp.			
10		NA	100	1.2	SAND, fine to medium, trace Gravel, fine, yellowish red, damp.	SW		
		NA	100	2.0	SAND, fine to medium, reddish yellow, damp.			
15		NA	100	1.4	SAND, fine to coarse, reddish yellow, damp.			
		NA	90	1.8	SAND, fine to coarse, reddish yellow, damp.			
		NA	100	1.8	SAND, fine to coarse, some Gravel, fine, yellowish brown, damp.	GW		
20		NA	40	2.0	SAND, fine to medium, some Clay, reddish brown, damp.	SC		
		NA	100	1.8	SAND, fine to coarse, little Clay, yellowish brown, damp.	SW		
25		NA	100	2.4	24-25'- SAND, fine to coarse, brown, damp. 25-26'- CLAY, gray, damp.	CL		
		NA	100	2.0	26-27'- CLAY, gray, damp. 27-28'- CLAY and SILT, gray to purple, damp.	CL ML		
		NA	100	2.9	28-29'- CLAY, little Silt, gray to purple, damp. 29-30'- CLAY and SILT, gray, damp.	CL CL ML		
30								

T-WRAP

PARSONS ENGINEERING SCIENCE
SOIL BORING LOG AND WELL CONSTRUCTION RECORD

Client Robins Air Force Base
Site Building 173 – Former Diesel UST Site
Boring I.D. GP-2
Geologist G. Hedrick

Project I.D. 726876.65122
Well I.D. NA
Date Installed NA

DEPTH (feet)	SAMPLE	BLOWS/6 IN	%REC.	HNu/OVA (ppm)	LITHOLOGIC DESCRIPTION	SOIL CLASS	GRAPHIC LOG	WELL DIAGRAM
30	X	NA	100	1.6	CLAY and SILT, gray, moist.	CL ML		
	X	NA	100	3.0	CLAY, some Sand, fine to medium, gray to purple to brown, moist.	SC		
35	X	NA	100	2.4	SILT, some Sand, fine, gray, moist.	SM		
	X	NA	100	NA	36-36.5'- SILT and SAND, fine to medium, gray, wet. 36.5-38'- SAND, fine to medium, white, wet.	SW		
	X	NA	100	NA	SILT and SAND, fine, gray, wet.	SM		
40					Boring Terminated 40 feet below ground surface.			
45								
50								
55								
60								
65								

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PARSONS ENGINEERING SCIENCE, INC.
SOIL BORING LOG AND WELL CONSTRUCTION RECORD

Client Robins Air Force Base
Site Building 173 - Former Diesel UST Site
Boring I.D. GP-3
Geologist/Engineer G. Hedrick
Drilling Method Geoprobe
Sampling Method Acetate Liner Sampling Tube
Date Started 8/01/96
Date Completed 8/01/96
Driller Fugro
Borehole Diameter (in) 2.0
Depth Drilled (ft) 46
Ground Elevation (ft) NA
Depth to Water (ft) NA
Date Measured NA

Project I.D. 726876.65122
Well I.D. NA
Date Installed NA
Date Grouted NA
Casing Material NA
Screen Material NA
Casing Interval (ft) NA
Screened Interval (ft) NA
Sump Installed? NA
Well Depth (ft) NA
TOC Elevation (ft) (msl) NA
Water Lvl. from TOC (ft) NA
Date Measured NA

DEPTH (feet)	SAMPLE	BLOWS/6 IN	% REC.	HNu/OVA (ppm)	LITHOLOGIC DESCRIPTION	SOIL CLASS	GRAPHIC LOG	WELL DIAGRAM
0		NA	80	0.8	SAND and CLAY, fine, yellowish red, damp.	SC		
		NA	100	0.6	CLAY, some Sand, fine, yellowish brown, damp.			
5		NA	100	0.6	CLAY and SAND, fine, yellowish brown, damp.			
		NA	100	1.0	CLAY and SAND, fine, yellowish brown, damp.			
		NA	100	5.8	CLAY, little Sand, fine, gray to reddish brown, damp.	CH		
10		NA	100	0.2	10-11'- CLAY, trace Sand, fine, gray with red striations, damp. 11-12'- SAND, fine to coarse, reddish brown, damp.	SW		
		NA	80	0.7	SAND, fine to coarse, yellowish red, damp.			
15		NA	100	1.0	SAND, fine to coarse, yellowish brown, damp.			
		NA	70	0.4	SAND, fine to coarse, some Gravel, fine, reddish brown, damp.	GW		
		NA	100	0.8	SAND, fine to medium, reddish brown, damp.	SW		
20		NA	100	1.4	SAND, fine to coarse, some Gravel, fine, yellowish brown, damp.	GW		
		NA	100	0.6	22-23'- SAND, fine to coarse, little Gravel, fine, yellowish brown, damp. 23-24'- SAND, fine to coarse, some Clay, reddish brown, moist.	SW SC		
25		NA	100	2.0	24-25'- SAND, fine to medium, some Clay, reddish brown, moist. 25-26'- CLAY, gray, damp.	CL		
		NA	100	0.6	CLAY, gray to gray with purple striations, damp.			
		NA	100	2.4	CLAY and SAND, fine to medium, yellowish brown to gray, moist.	SC		
30								

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PARSONS ENGINEERING SCIENCE
SOIL BORING LOG AND WELL CONSTRUCTION RECORD

Client Robins Air Force Base
Site Building 173 - Former Diesel UST Site
Boring I.D. GP-3
Geologist G. Hedrick

Project I.D. 726876.65122
Well I.D. NA
Date Installed NA

DEPTH (feet)	SAMPLE	BLOWS/6 IN	%REC.	HNu/OVA (ppm)	LITHOLOGIC DESCRIPTION	SOIL CLASS	GRAPHIC LOG	WELL DIAGRAM
30	X	NA	100	1.0	30-31'- CLAY and SAND, fine to medium, yellowish brown to gray, moist. 31-32'- SILT, gray, moist.	SC / ML		
	X	NA	100	2.4	CLAY, gray with purple striations, moist.	CL		
35	X	NA	100	1.4	CLAY and SAND, fine to medium, gray, moist.	SC		
	X	NA	100	1.6	SAND, fine to coarse, some Clay, yellowish brown, moist.			
	X	NA	90	1.4	SAND, fine to coarse, white, moist.	SW		
40	X	NA	100	1.4	CLAY and SAND, fine to medium, gray to yellowish brown, moist.	SC		
	X	NA	100	2.0	SAND, fine to medium, gray to yellowish brown, moist. (1" Clay layers at approximately 42'10", 43', and 43'10")	SW		
45	X	NA	100	NA	SAND and SILT, fine, white, wet.	SM		
					Boring Terminated 46 feet below ground surface.			
50								
55								
60								
65								

T-WRAP

PARSONS ENGINEERING SCIENCE, INC.
SOIL BORING LOG AND WELL CONSTRUCTION RECORD

Client Robins Air Force Base
Site Building 173 - Former Diesel UST Site
Boring I.D. GP-4
Geologist/Engineer G. Hedrick
Drilling Method Geoprobe
Sampling Method Acetate Liner Sampling Tube
Date Started 8/01/96
Date Completed 8/01/96
Driller Fugro
Borehole Diameter (in) 2.0
Depth Drilled (ft) 42
Ground Elevation (ft) NA
Depth to Water (ft) NA
Date Measured NA

Project I.D. 726876.65122
Well I.D. NA
Date Installed NA
Date Grouted NA
Casing Material NA
Screen Material NA
Casing Interval (ft) NA
Screened Interval (ft) NA
Sump Installed? NA
Well Depth (ft) NA
TOC Elevation (ft) (msl) NA
Water Lvl. from TOC (ft) NA
Date Measured NA

DEPTH (feet)	SAMPLE	BLOWS/6 IN	% REC.	HNu/OVA (ppm)	LITHOLOGIC DESCRIPTION	SOIL CLASS	GRAPHIC LOG	WELL DIAGRAM
0		NA	70	1.0	SILT and SAND, fine, dark gray, damp.	SM		
		NA	100	2.0	SILT and SAND, fine, dark gray, damp.n, damp.			
5		NA	80	2.6	SAND and CLAY, fine to medium, yellowish brown, damp.	SC		
		NA	100	2.2	6-7'- SAND and CLAY, fine to medium, yellowish brwon, damp. 7-8'- SAND, fine to medium, some Clay, yellowish brown, damp.			
		NA	100	8.2	SAND, fine to medium, little Clay, yellowish red, damp.	SW		
10		NA	100	2.4	SAND, fine to medium, little Clay, yellowish brown, damp.			
		NA	100	3.2	SAND, fine to medium, little Clay, brownish yellow, damp.			
15		NA	100	2.0	SAND, fine to medium, trace Clay, brownish yellow, damp.			
		NA	100	2.1	SAND, fine to coarse, little Clay, brownish yellow, damp.			
		NA	100	2.6	SAND, little Clay, fine to coarse, brownish yellow, damp.			
20		NA	100	2.7	SAND, fine to coarse, little Gravel, fine, little Clay, brownish yellow, damp.			
		NA	100	1.0	SAND, fine to coarse, some Clay, brownish yellow, moist.	SC		
25		NA	100	2.4	CLAY, light gray with purple striations, damp.	CL		
		NA	100	1.6	CLAY, light gray with purple striations, damp.			
		NA	100	3.4	CLAY, light gray with purple striations, damp.			
30						ML CL		

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PARSONS ENGINEERING SCIENCE
SOIL BORING LOG AND WELL CONSTRUCTION RECORD

Client Robins Air Force Base
Site Building 173 - Former Diesel UST Site
Boring I.D. GP-4
Geologist G. Hedrick

Project I.D. 726876.65122
Well I.D. NA
Date Installed NA

DEPTH (feet)	SAMPLE	BLOWS/6 IN	%REC.	HNu/OVA (ppm)	LITHOLOGIC DESCRIPTION	SOIL CLASS	GRAPHIC LOG	WELL DIAGRAM
30	X	NA	100	2.4	SILT, some Clay, gray, damp.	ML CL		
	X	NA	100	2.4	SILT, some Clay, light gray.			
	X	NA	100	1.8	33-34'- SAND, fine to medium, light gray, moist. 34-35'- SILT, some Sand, fine, light gray, moist.	SW SM		
35	X	NA	90	2.4	SAND, fine to medium, yellow, moist.	SW		
	X	NA	100	1.2	37-38'- SAND, fine to medium, yellow, moist. 38-39'- CLAY, light gray, moist.	CL		
	X	NA	100	NA				
40	X				39-40.5'- CLAY, light gray, wet. 40.5-42'- SAND, fine to medium, Clay, light gray, wet.	SC		
		NA	100	NA				
					Boring Terminated 42 feet below ground surface.			
45								
50								
55								
60								
65								

PARSONS ENGINEERING SCIENCE, INC.
SOIL BORING LOG AND WELL CONSTRUCTION RECORD

Client Robins Air Force Base
Site Building 173 – Former Diesel UST Site
Boring I.D. GP-5
Geologist/Engineer G. Hedrick
Drilling Method Geoprobe
Sampling Method Acetate Liner Sampling Tube
Date Started 8/01/96
Date Completed 8/01/96
Driller Fugro
Borehole Diameter (in) 2.0
Depth Drilled (ft) 35
Ground Elevation (ft) NA
Depth to Water (ft) NA
Date Measured NA

Project I.D. 726876.65122
Well I.D. NA
Date Installed NA
Date Grouted NA
Casing Material NA
Screen Material NA
Casing Interval (ft) NA
Screened Interval (ft) NA
Sump Installed? NA
Well Depth (ft) NA
TOC Elevation (ft) (msl) NA
Water Lvl. from TOC (ft) NA
Date Measured NA

DEPTH (feet)	SAMPLE	BLOWS/6 IN	% REC.	HNu/OVA (ppm)	LITHOLOGIC DESCRIPTION	SOIL CLASS	GRAPHIC LOG	WELL DIAGRAM
0		NA	90	1.4	SILT, little Clay, little Sand, fine to coarse, trace Gravel, fine, brown to yellowish brown, dry.	ML		
		NA	100	1.5	SILT, some Clay, trace Sand, fine, yellowish brown, damp.	CL ML		
5		NA	100	1.9	SILT and CLAY, trace Sand, fine, yellowish brown to gray, damp.			
		NA	100	2.2	CLAY, little Sand, fine, reddish brown, damp.	CH		
		NA	20	2.3	CLAY, trace Sand, fine, reddish brown, damp.			
10		NA	100	2.2	CLAY, little Sand, fine, reddish brown, damp.			
		NA	100	2.6	CLAY, some Sand, fine to medium, yellowish brown, damp.	SC		
15		NA	100	60	CLAY, some Sand, fine to medium, yellowish brown, damp.			
		NA	100	2.0	CLAY and SAND, fine, yellowish brown, damp.			
		NA	100	2.4	CLAY and SAND, fine to coarse, yellowish brown, moist.			
20		NA	100	2.3	SAND, fine to coarse, little Gravel, fine, yellowish brown, damp.	SW		
		NA	100	1.5	SAND and CLAY, fine to coarse, little Gravel, fine, yellowish brwon, moist.	SC		
25		NA	100	2.2	CLAY, gray with purple striations, damp.	CL		
		NA	100	1.7	CLAY, gray with purple striations, damp.			
		NA	100	1.1	CLAY, gray with purple striations, damp.			
		NA	100	2.4	CLAY, gray with purple striations.			
30						SC		

T-WRAP

PARSONS ENGINEERING SCIENCE
SOIL BORING LOG AND WELL CONSTRUCTION RECORD

Client Robins Air Force Base
Site Building 173 – Former Diesel UST Site
Boring I.D. GP-5
Geologist G. Hedrick

Project I.D. 726876.65122
Well I.D. NA
Date Installed NA

DEPTH (feet)	SAMPLE	BLOWS/6 IN	%REC.	HNu/OVA (ppm)	LITHOLOGIC DESCRIPTION	SOIL CLASS	GRAPHIC LOG	WELL DIAGRAM
30	X	NA	90	1.9	CLAY, some Sand, fine, white, damp.	SC		
	X	NA	100	1.4	CLAY, gray with purple striations, damp.	CL		
	X	NA	100	1.4	SAND, fine to medium, trace Clay, white, damp.	SW		
35	X	NA	100	1.6	SAND, fine to medium, little Clay, white moist.			
					Boring Terminated 38 feet below ground surface.			
40								
45								
50								
55								
60								
65								

PARSONS ENGINEERING SCIENCE, INC.
SOIL BORING LOG AND WELL CONSTRUCTION RECORD

Client Robins Air Force Base
Site Building 173 - Former Diesel UST Site
Boring I.D. GP-6
Geologist/Engineer G. Hedrick
Drilling Method Geoprobe
Sampling Method Acetate Liner Sampling Tube
Date Started 8/02/96
Date Completed 8/02/96
Driller Fugro
Borehole Diameter (in) 2.0
Depth Drilled (ft) 37
Ground Elevation (ft) NA
Depth to Water (ft) NA
Date Measured NA

Project I.D. 726876.65122
Well I.D. NA
Date Installed NA
Date Grouted NA
Casing Material NA
Screen Material NA
Casing Interval (ft) NA
Screened Interval (ft) NA
Sump Installed? NA
Well Depth (ft) NA
TOC Elevation (ft) (msl) NA
Water Lvl. from TOC (ft) NA
Date Measured NA

DEPTH (feet)	SAMPLE	BLOWS/6 IN	% REC.	HNu/OVA (ppm)	LITHOLOGIC DESCRIPTION	SOIL CLASS	GRAPHIC LOG	WELL DIAGRAM
0		NA	80	1.4	CLAY, little Sand, fine, yellowish brown, damp.	CH		
		NA	100	2.0	CLAY, little Sand, fine, yellowish brown, damp.			
5		NA	100	1.2	CLAY, some Sand, fine, gray to yellowish brown, damp.	SC		
		NA	100	1.4	CLAY, yellowish brown, damp.	CL		
		NA	100	0.0	SAND and CLAY, fine, yellowish brown, moist.	SC		
10		NA	100	0.0	SAND and CLAY, fine, yellowish brown, moist.			
		NA	80	1.0	CLAY and SAND, fine, yellowish brown, moist.			
15		NA	100	2.4	CLAY, some Sand, fine, yellowish brown, moist.			
		NA	100	2.0	SAND, fine to coarse, little Gravel, fine, pale brown, damp.	SW		
		NA	100	2.0	SAND, fine to coarse, some Clay, brownish yellow, moist.	SC		
20		NA	100	1.6	SAND, fine to coarse, little Clay, yellow, damp.	SC		
		NA	100	1.0	SAND, fine to coarse, reddish brown, damp.			
25		NA	100	1.2	CLAY, pale purple, damp.	CL		
		NA	100	1.0	CLAY, gray to pale purple, damp.			
		NA	100	1.3	SILT and CLAY, light gray, moist.	CL ML		
30								

T-WRAP

PARSONS ENGINEERING SCIENCE
SOIL BORING LOG AND WELL CONSTRUCTION RECORD

Client Robins Air Force Base
Site Building 173 - Former Diesel UST Site
Boring I.D. GP-6
Geologist G. Hedrick

Project I.D. 726876.65122
Well I.D. NA
Date Installed NA

DEPTH (feet)	SAMPLE	BLOWS/6 IN	%REC.	HNu/OVA (ppm)	LITHOLOGIC DESCRIPTION	SOIL CLASS	GRAPHIC LOG	WELL DIAGRAM
30	X	NA	100	1.0	SILT, some Clay, white to light gray, damp.	CL ML		
	X	NA	90	1.4	CLAY, some Sand, fine, light gray, moist.	SC		
	X	NA	100	1.7	SAND, fine to medium, white, moist.	SW		
35	X	NA	100	1.1	35-36'- SAND, fine to medium, white, moist. 36-37'- CLAY and SAND, fine to medium, white, moist. SAND, fine to medium, little Clay, white moist.	SC		
					Boring Terminated 37 feet below ground surface.			
40								
45								
50								
55								
60								
65								

T-WRAP

PARSONS ENGINEERING SCIENCE, INC.
SOIL BORING LOG AND WELL CONSTRUCTION RECORD

Client Robins Air Force Base
Site Building 173 – Former Diesel UST Site
Boring I.D. GP-7
Geologist/Engineer G. Hedrick
Drilling Method Geoprobe
Sampling Method Acetate Liner Sampling Tube
Date Started 8/02/96
Date Completed 8/02/96
Driller Fugro
Borehole Diameter (in) 2.0
Depth Drilled (ft) 38
Ground Elevation (ft) NA
Depth to Water (ft) NA
Date Measured NA

Project I.D. 726876.65122
Well I.D. NA
Date Installed NA
Date Grouted NA
Casing Material NA
Screen Material NA
Casing Interval (ft) NA
Screened Interval (ft) NA
Sump Installed? NA
Well Depth (ft) NA
TOC Elevation (ft) (msl) NA
Water Lvl. from TOC (ft) NA
Date Measured NA

DEPTH (feet)	SAMPLE	BLOWS/6 IN	% REC.	HNu/OVA (ppm)	LITHOLOGIC DESCRIPTION	SOIL CLASS	GRAPHIC LOG	WELL DIAGRAM
0		NA	90	1.6	CLAY, little Silt, trace Sand, fine, brownish yellow, dry.	CH		
		NA	100	0.8	CLAY, some Silt, trace Sand, fine, yellowish brown, damp.	CL ML		
5		NA	100	1.0	CLAY, little Sand, fine to coarse, reddish yellow, damp.	CH		
		NA	100	1.8	CLAY, little Sand, fine to medium, yellowish brown.			
		NA	100	1.8	CLAY, little Sand, fine to medium, yellowish brown, damp.			
10		NA	100	2.0	SAND, fine to coarse, little Clay, yellowish brown, damp.	SW		
		NA	100	2.0	SAND, fine to medium, little Clay, yellowish brown, damp.			
15		NA	100	1.7	SAND, fine to very coarse, brownish yellow, damp.			
		NA	100	2.0	SAND, fine to medium, pale red, damp.			
		NA	100	1.1	SAND, fine to very coarse, trace Clay, yellowish brown, damp.			
20		NA	90	2.2	SAND, fine to coarse, yellowish brown, moist.			
		NA	100	1.8	SAND, fine to coarse, some Clay, yellowish brown, moist.	SC		
25		NA	100	1.4	CLAY, gray to purple, damp.	CL		
		NA	100	0.8	CLAY, gray to purple, damp.			
		NA	100	1.8	CLAY, some Silt, gray, damp.	CL ML		
30								

T-WRAP

PARSONS ENGINEERING SCIENCE
SOIL BORING LOG AND WELL CONSTRUCTION RECORD

Client Robins Air Force Base
Site Building 173 – Former Diesel UST Site
Boring I.D. GP-7
Geologist G. Hedrick

Project I.D. 726876.65122
Well I.D. NA
Date Installed NA

DEPTH (feet)	SAMPLE	BLOWS/6 IN	%REC.	HNu/OVA (ppm)	LITHOLOGIC DESCRIPTION	SOIL CLASS	GRAPHIC LOG	WELL DIAGRAM
30	X	NA	100	1.8	SILT and CLAY, gray, damp.	CL		
	X	NA	100	1.8	CLAY, some Silt, gray, damp.	ML		
	X	NA	100	1.8	CLAY, some Sand, fine, little Silt, gray, damp.	SC		
35	X				SAND, fine to medium, little Clay, white moist.	SW		
	X	NA	100	1.8	36-37'- SAND, fine to medium, little Clay, white, moist. 37-38'- CLAY, white, moist.	CL		
					Boring Terminated 38 feet below ground surface.			
40								
45								
50								
55								
60								
65								

T-MRAP

APPENDIX C
LABORATORY ANALYTICAL RESULTS

SOIL SAMPLE ANALYTICAL RESULTS

Inchcape Testing Services
Environmental Laboratories

CUSTOMER: PARSONS ENGINEERING SCIENCE
PROJECT: 726876.65122 Building 173 RAFB

REPORT NUMBER: D96-8694
SAMPLES RECEIVED: 3-August-1996

TABLE OF CONTENTS
(D96-8694)

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED: 3-AUG-1996

REPORT NUMBER: D96-8694
REPORT DATE: 22-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc.
ADDRESS : 57 Executive Park, Suite #300
Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

PROJECT : 726876.65122 Building 173 RAFB

DATE SAMPLED : 31-July-1996

SDG NARRATIVE

This is a Level III data package, containing CLP-like forms for the analysis of volatile organics, polynuclear aromatic hydrocarbons and total petroleum hydrocarbons. These analyses have been completed by U.S. Environmental Protection Agency SW846 (RCRA) and ASTM criteria.

EPA Method 8020 modified Volatiles Analysis

Second Column Confirmation

For the following samples, the following compounds did not agree within 50% between the primary and confirmation columns:

D96-8694-3	o-xylene
D96-8694-7	ethylbenzene m,p-xylenes
D96-8694-9	ethylbenzene m,p-xylenes o-xylene

Therefore, in each case, the lower of the two values was reported. The results for these analytes in these samples should be considered unconfirmed.

EPA Method 8310 Polynuclear Aromatic Hydrocarbons Analysis

Sample Dilutions

Samples D96-8694-9 and -10 required 1:5 dilutions, due to high levels of target analytes.

Parsons Engineering Science, Inc.
page 2

EPA Method 8015M Total Extractable Petroleum Hydrocarbons Analysis

No observations were documented for the total extractable petroleum hydrocarbons analysis.

No further observations were documented during the sample analysis for this task.

Please refer to the attached Case Narrative Summary for sample identifications and analytical requests.

Sample calculations are attached to this SDG narrative.

If there are any questions, feel free to contact Ms. Jacqueline Mayhew, at (214) 238-5591.

Alan Humason

Alan Humason
QA Coordinator

Inchcape Testing Services
Environmental Laboratories

CASE NARRATIVE

Inchcape Testing Services
Environmental Laboratories

JOB ID	D96-8694
CUSTOMER	Parsons Engineering Science
PROJECT	726876.65122 Building 173 RAFB

SAMPLE ID : D96-8694-1 DATE SAMPLED : 31-JUL-1996
ID MARKS : RAFB-GP1# N1#(14-16')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	8-AUG-1996	0808831001
RBN_BTXS /1	RFG	8-AUG-1996	MKS	8-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	VHL	10-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221606

SAMPLE ID : D96-8694-2 DATE SAMPLED : 31-JUL-1996
ID MARKS : RAFB-GP1# N1#(36-38')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	8-AUG-1996	MKS	9-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	10-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221606

SAMPLE ID : D96-8694-3 DATE SAMPLED : 31-JUL-1996
ID MARKS : RAFB-GP2# N1#(6-8')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	8-AUG-1996	MKS	8-AUG-1996	0808802001
RBN_BTXSC1 /1	RFG	8-AUG-1996	MKS	8-AUG-1996	0808802001
RBN_BTXSC2 /1	RFG	10-AUG-1996	MKS	10-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	11-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221606

JOB ID : D96-8694
CUSTOMER : Parsons Engineering Science
PROJECT : 726876.65122 Building 173 RAFB

SAMPLE ID : D96-8694-4 DATE SAMPLED : 31-JUL-1996
ID MARKS : RAFB-GP2# N1#(34-36')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	8-AUG-1996	MKS	8-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	11-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221606

SAMPLE ID : D96-8694-5 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-GP3# N1#(8-10')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	8-AUG-1996	MKS	8-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	11-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221606

SAMPLE ID : D96-8694-6 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-GP3# N1#(42-44')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	8-AUG-1996	MKS	9-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	11-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221606

SAMPLE ID : D96-8694-7 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-GP4# N1#(8-10')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001

Inchcape Testing Services
Environmental Laboratories

SAMPLE ID : D96-8694-7 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-GP4# N1#(8-10')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN_BTXS /1	RFG	8-AUG-1996	MKS	9-AUG-1996	0808802001
RBN_BTXSC1 /1	RFG	8-AUG-1996	MKS	9-AUG-1996	0808802001
RBN_BTXSC2 /1	RFG	10-AUG-1996	MKS	10-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	11-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221606

SAMPLE ID : D96-8694-8 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-GP4# N1#(37-39')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	8-AUG-1996	MKS	8-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	11-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221607

SAMPLE ID : D96-8694-9 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-GP5# N1#(14-16')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	9-AUG-1996	MKS	9-AUG-1996	0808802001
RBN_BTXSC1 /1	RFG	8-AUG-1996	MKS	9-AUG-1996	0808802001
RBN_BTXSC2 /1	RFG	10-AUG-1996	MKS	10-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	11-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221607

SAMPLE ID : D96-8694-10 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-GP5# N1#(23-25')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001

SAMPLE ID : D96-8694-10 DATE SAMPLED : 1-AUG-1996 ID MARKS : RAFB-GP5# N1#(23-25')					
ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN_BTXS /1	RFG	9-AUG-1996	MKS	9-AUG-1996	0808802001
RBN_BTXSC1 /1	RFG	8-AUG-1996	MKS	9-AUG-1996	0808802001
RBN_BTXSC2 /1	RFG	9-AUG-1996	MKS	9-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	11-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221607

SAMPLE ID : D96-8694-11 DATE SAMPLED : 1-AUG-1996 ID MARKS : RAFB-GP5# N1#(36-38')					
ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	8-AUG-1996	MKS	8-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	11-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221607

SAMPLE ID : D96-8694-12 DATE SAMPLED : 2-AUG-1996 ID MARKS : RAFB-GP6# N1#(14-16')					
ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	9-AUG-1996	MKS	9-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	11-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221607

SAMPLE ID : D96-8694-13 DATE SAMPLED : 2-AUG-1996 ID MARKS : RAFB-GP6# N1#(35-37')					
ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	8-AUG-1996	MKS	8-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	11-AUG-1996	0809801503

SAMPLE ID : D96-8694-13 DATE SAMPLED : 2-AUG-1996
ID MARKS : RAFB-GP6# N1#(35-37')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
SOLID_TPER /1			SAB	12-AUG-1996	0812221607

SAMPLE ID : D96-8694-14 DATE SAMPLED : 2-AUG-1996
ID MARKS : RAFB-GP7# N1#(20-22')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	8-AUG-1996	MKS	8-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	11-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221607

SAMPLE ID : D96-8694-15 DATE SAMPLED : 2-AUG-1996
ID MARKS : RAFB-GP7# N1#(30-32')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	9-AUG-1996	MKS	9-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	11-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221607

SAMPLE ID : D96-8694-16 DATE SAMPLED : 2-AUG-1996
ID MARKS : RAFB-GP7# N1#(36-38')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	8-AUG-1996	MKS	9-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	11-AUG-1996	0809801503
SOLID_TPER /1			SAB	12-AUG-1996	0812221607

JOB ID : D96-8694
CUSTOMER : Parsons Engineering Science
PROJECT : 726876.65122 Building 173 RAFB

SAMPLE ID : D96-8694-17 DATE SAMPLED : 3-AUG-1996
ID MARKS : LABQC# LB1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	8-AUG-1996	MKS	8-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	10-AUG-1996	0809801503

SAMPLE ID : D96-8694-18 DATE SAMPLED : 3-AUG-1996
ID MARKS : LABQC# BS1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	20-AUG-1996	0808831001
RBN_BTXS /1	RFG	8-AUG-1996	MKS	8-AUG-1996	0808802001
RBN_TEHS /1	GWG	9-AUG-1996	MTW	10-AUG-1996	0809801503

SAMPLE ID : D96-8694-19 DATE SAMPLED : 3-AUG-1996
ID MARKS : LABQC# LR1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
SOLID_TPER /1			SAB	12-AUG-1996	0812221606#8694-7

SAMPLE ID : D96-8694-20 DATE SAMPLED : 31-JUL-1996
ID MARKS : LABQC# LR2#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
SOLID_TPER /1			SAB	12-AUG-1996	0812221607#8694-16

SAMPLE ID : D96-8694-21 DATE SAMPLED : 31-JUL-1996
ID MARKS : RAFB-GP1# MS1#(14-16')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	8-AUG-1996	0808831001#8694-1
RBN_BTXS /1	MKS	8-AUG-1996	MKS	9-AUG-1996	0808802001#8694-1

SAMPLE ID : D96-8694-21 DATE SAMPLED : 31-JUL-1996 ID MARKS : RAFB-GP1# MS1#(14-16')					
ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN_TEHS /1	GWG	9-AUG-1996	MTW	10-AUG-1996	0809801502#8694-1

SAMPLE ID : D96-8694-22 DATE SAMPLED : 31-JUL-1996 ID MARKS : RAFB-GP1# SD1#(14-16')					
ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310S /1	PSS	8-AUG-1996	JXA	8-AUG-1996	0808831001#8694-1
RBN_BTXS /1	MKS	8-AUG-1996	MKS	9-AUG-1996	0808802001#8694-1
RBN_TEHS /1	GWG	9-AUG-1996	MTW	10-AUG-1996	0809801502#8694-1

ANALYSIS	DESCRIPTION
RBN8310S	IRPIMS PAH for Bioventing Project, Solid
RBN_BTXS	IRPIMS BTEX for Bioventing Project, Solid
RBN_TEHS	IRPIMS TEH for Bioventing Project, Solid
SOLID_TPER	Total Solids, Soil/Sludge, %
RBN_BTXSC1	IRPIMS BTEX for Bioventing Project, Solid
RBN_BTXSC2	IRPIMS BTEX for Bioventing Project, Solid

GC ANALYSIS, SOIL

Formulas used for calculations

$$\text{Concentration } (\mu g/L) = \frac{(A_x)(I_s)(V_t)(Df)}{(A_{is})(RRF)(V_i)(W_s)\ (D)}$$

Where:

A_x = Area of the peak for the compound to be measured.
A_{is} = Area of the peak for the internal standard.
I_s = Amount of internal standard injected in nanograms (ng).
V_i = Volume of extract injected (μL).
V_t = Volume of concentrated extract in microliters (μL).
Df = Dilution factor. (see below)
RRF = Relative response factor. (see below)
D = $\frac{100 - \%\ moisture}{100}$
W_s = Weight of sample extracted in grams (g).

Dilution factor =

$$\frac{\mu L \text{ most conc. extract used to make dilution} + \mu L \text{ clean solvent}}{\mu L \text{ most conc. extract used to make dilution}}$$

If no dilution is performed, Df = 1.0

$$\text{Relative Response Factor} = \frac{A_x}{A_{is}} \times \frac{C_{is}}{C_x}$$

A_x = Area of the peak for the compound to be measured.
A_{is} = Area of the peak for the specific internal standard.
C_{is} = Concentration of the internal standard (μg/mL).
C_x = Concentration of the compound to be measured (μg/mL).

HPLC ANALYSIS, SOIL

Formulas used for calculations

$$\text{Concentration } (\mu g/Kg) = \frac{(A_x)(V_t)(Df)(2.0)}{(CF)(V_i)(W_s)(D)}$$

Where:

A_x = Area of the peak for the compound to be measured.
V_t = Volume of the concentrated extract in microliters (μL).
V_i = Volume of extract injected onto each column in microliters (μL).
Df = Dilution factor. (see below)
CF = Average calibration factor (see below)
D = $\frac{100 - \%\ \text{moisture}}{100}$
W_s = Weight of sample extracted in grams (g).

Dilution factor =

$$\frac{\mu L \text{ most conc. extract used to make dilution} + \mu L \text{ clean eluent}}{\mu L \text{ most conc. extract used to make dilution}}$$

If no dilution is performed, Df = 1.0

$$\text{Calibration Factor} = \frac{\text{Peak Area (or Height) of the Standard}}{\text{Mass Injected (ng)}}$$

CHAIN OF CUSTODY

Inchcape Testing Services Environmental Laboratories 1089 East Collins Blvd., #100 Richardson, TX 75081 (214) 238-5591 **CHAIN OF CUSTODY RECORD**

Report to:		Invoice to	
Company:	Parsons ES	Company:	SAME
Address:	Atlanta	Address:	
Contact:		Contact:	
Phone:		Phone:	
Fax:		PO/SO #:	

Sampler's Name: Greg Hedrick | Sampler's Signature: [signature]

Lab use only
Due Date:

Temp. of coolers when received (C°): 1 4 | 2 | 3 | 4 | 5

Custody Seal N / Y (Y circled)
Intact N / Y (Y circled)
Screened For Radioactivity ☒

Proj. No.: 726876 | Project Name: 65122 Building 173 Robins AFB

ANALYSIS REQUESTED: BTEX 8020 | PAH 8310 | TPH-DRO 8015

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	VOA	A/G 1 Lt.	250 ml	P/O	BTEX 8020	PAH 8310	TPH-DRO 8015	Lab Sample ID (Lab Use Only)
S	7/31	1600		X	073196 - RAFB - GP1 - 14-16'				2				8694 - 1
↓	↓	1645		↓	073196 - RAFB - GP1 - 36-38'				2				2
		1820			073196 - RAFB - GP2 - 6-8'				2				3
	✓	1900			073196 - RAFB - GP2 - 34-36'				2				4
	8/1	1015			080196 - RAFB - GP3 - 8-10'				2				5
	↓	1100			080196 - RAFB - GP3 - 42-44'				2				6
		1405			080196 - RAFB - GP4 - 8-10'				2				7
		1505			080196 - RAFB - GP4 - 37-39'				2				8
		~~1715~~ 1650 GH			080196 - RAFB - GP5 - 14-16'				2				9
✓	✓	~~1740~~ 1715 GH		✓	080196 - RAFB - GP5 - 23-25'				2				10

Turn around time ☒ Priority 1 or Standard ☐ Priority 2 or 50% ☐ Priority 3 or 100% ☐ Priority 4 ERS *

* BTEX (602/8020), TPH (418.1 or 8015), VOLATILES (624/8240), IGNITABILITY, TOTAL LEAD (6010)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	8/2	1445	[signature]	8/3/96	1000

Remarks

ORIGINAL

Client's delivery of samples constitutes acceptance of Inchcape/ITS-Dallas terms and conditions contained in the Price Schedule.

[1] Matrix: WW - Wastewater, W - Water, S - Soil, SD - Solid, L - Liquid, A - Air Bag, C - Charcoal tube, SL - Sludge, O - Oil
[2] Container: VOA - 40 ml vial, A/G - Amber / Or Glass 1 Liter, 250 ml - Glass wide mouth, P/O - Plastic or other

Inchcape cannot accept verbal changes. Please Fax written changes to 214-238-5592

OFFICE USE ONLY

Inchcape Testing Services Dallas — 1089 East Collins Blvd., Richardson, TX 75081 (214) 238-5591

CHAIN OF CUSTODY RECORD

Report to:		Invoice to	
Company:	Parsons ES	Company:	Same
Address:	Atlanta	Address:	
Contact:	Steve Ratzlaff	Contact:	
Phone:		Phone:	
Fax:		PO/SO #:	

Sampler's Name: Greg Hedrick — Sampler's Signature: Greg Hedrick

Lab use only — Due Date: 15 / 1

Temp. of coolers when received (C°): 1: 4 | 2: | 3: | 4: | 5:

Custody Seal N/Y — Y

Intact N/Y — Y

Screened For Radioactivity ☒

ANALYSIS REQUESTED: BTEX 8020; PAH 8310; TPH-DRO 8015

Proj. No.	Project Name													
Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	VOA	A/G 1 Lt.	250 ml	P/O[2]	BTEX 8020	PAH 8310	TPH-DRO 8015		Lab Sample ID (Lab Use Only)
S	8/1	1740		X	080196-RAFB-GP5-36-38'				2					8694-11
	8/2	0800			080296-RAFB-GP6-14-16'				2					12
		0850			080296-RAFB-GP6-35-37'				2					13
		1145			080296-RAFB-GP7-20-22'				2					14
		1200			080296-RAFB-GP7-30-32'				2					15
		1220			080296-RAFB-GP7-36-38'				2					16
					Method Blank LB1									17
					BS1									18
					~~BD1~~									19
					~~073196-RAFB-GP1 MS1 14-16'~~	JDM Not Required								20
					~~073196-RAFB-GAS D1 14-16'~~ JDM									21

Turn around time ☒ Priority 1 or Standard ☐ Priority 2 or 50% ☐ Priority 3 or 100% ☐ Priority 4 ERS *

* BTEX (602/8020), TPH (418.1 or 8015), VOLATILES (624/8240), IGNITABILITY, TOTAL LEAD (6010)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Greg Hedrick	8/2	1445	Laura Omey	8/3/96	1000
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Remarks

Client's delivery of samples constitutes acceptance of Inchcape/ITS-Dallas terms and conditions contained in the Price Schedule.

[1] Matrix: WW - Wastewater, W - Water, S - Soil, SD - Solid, L - Liquid, A - Air Bag, C - Charcoal tube, SL - Sludge, O - Oil
[2] Container: VOA - 40 ml vial, A/G - Amber / Or Glass 1 Liter, 250 ml - Glass wide mouth, P/O - Plastic or other

ITS - Dallas cannot accept verbal changes. Please Fax written changes to 214-238-5592

OFFICE USE ONLY

COOLER RECEIPT FORM

726876.65122

Date Received: 8/3/96 Project: Robins AFB

Date Logged-in: 8/3/96 Received by: [signature]

1	Shipping slip. If yes, carrier and bill number: FED EX 901599 5063	Yes	No
2	Custody seals on cooler. If yes, how many and where: 1 on front	Yes	No
3	Custody seals intact.	Yes	No
4	Chain of Custody in plastic.	Yes	No
5	Chain of Custody filled out properly.	Yes	No
6	Client signed Chain of Custody.	Yes	No
7	Samples shipped on ice. If no, temperature of cooler:	Yes	No
8	All bottles sealed.	Yes	~~No~~ DM
9	All bottles received intact.	Yes	No
10	Labels in good condition and complete.	Yes	No
11	Sample labels agree with Chain of Custody.	Yes	No
12	Correct containers used.	Yes	No
13	Correct preservative used.	Yes	No
14	Sufficient sample provided.	Yes	No
15	Bubbles absent from VOA.	Yes	No
16	Comments (use corrective action form if necessary):		

+51
55
62

FedEx USA Airbill Tracking Number **9015995063**

FedEx Retrieval Copy
104 200 53710401 6030M

1 From

Date 8/2/96 Sender's FedEx Account Number 0300-0541-0

Sender's Name Greg Wedrick Phone (404) 235-2300

Company PARSONS ENGINEERING SCIENCE

Address 57 EXECUTIVE PARK S STE 500

City ATLANTA State GA Zip 30329

2 Your Internal Billing Reference Information 726576.65122

3 To

Recipient's Name James McKittrick Phone (214) 235-5591

Company Inchcape Testing Services

Address 1089 E. Collins Blvd

City Richardson State TX Zip 75081

For HOLD at FedEx Location check here
Hold Weekday
Hold Saturday

For Saturday Delivery check here

9 0 1 5 9 9 5 0 6 3

4 Service

5 Packaging

6 Special Handling

Cargo Aircraft Only

7 Payment

Cash/Check

Total Packages 3 Total Weight 168

Total Charges $

Credit Card Auth.

8 Release Signature

232

WCSL 1295
Rev. Date 10/95 • PART #147381

Inchcape Testing Services
NDRC Laboratories

1089 E. Collins Blvd.
Richardson, TX 75081
Tel. 214-238-5591
Fax. 214-238-5592

ANALYTICAL RESULTS

Inchcape Testing Services
Environmental Laboratories

1089 E. Collins Blvd.
Richardson, TX 75081
Tel. 214-238-5591
Fax. 214-238-5592

ANALYTICAL REPORT

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694
REPORT DATE : 22-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff
PROJECT : 726876.65122 Building 173 RAFB

Included in this data package are the analytical results for the sample group which you have submitted to Inchcape Testing Services for analysis. These results are representative of the samples as received by the laboratory.

The information contained herein has undergone extensive review and is deemed accurate and complete. Sample analysis and quality control were performed in accordance with all applicable protocols. Any deviations from these protocols or observations of interest are detailed in an accompanying Case Narrative. Please refrain from reproducing this report except in its entirety.

If you have any questions regarding this report and its associated materials please call your Project Manager at (214) 238-5591.

We appreciate the opportunity to serve you and look forward to providing continued service in the future.

Martin Jeffus

Martin Jeffus
General Manager

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-1
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP1#
: N1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.30 mg/Kg	< 1.30 mg/Kg	U
Acenaphthylene	1.66 mg/Kg	< 1.66 mg/Kg	U
Anthracene	0.475 mg/Kg	< 0.475 mg/Kg	U
Benzo(a)anthracene	0.0097 mg/Kg	< 0.0097 mg/Kg	U
Benzo(a)pyrene	0.0162 mg/Kg	< 0.0162 mg/Kg	U
Benzo(b)fluoranthene	0.0130 mg/Kg	< 0.0130 mg/Kg	U
Benzo(g,h,i)perylene	0.0540 mg/Kg	< 0.0540 mg/Kg	U
Benzo(k)fluoranthene	0.0119 mg/Kg	< 0.0119 mg/Kg	U
Chrysene	0.108 mg/Kg	< 0.108 mg/Kg	U
Dibenz(a,h)anthracene	0.0216 mg/Kg	< 0.0216 mg/Kg	U
Fluoranthene	0.151 mg/Kg	< 0.151 mg/Kg	U
Fluorene	0.151 mg/Kg	< 0.151 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0324 mg/Kg	< 0.0324 mg/Kg	U
Naphthalene	1.30 mg/Kg	< 1.30 mg/Kg	U

Inchcape Testing Services
Environmental Laboratories

REPORT NUMBER : D96-8694-1
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS				
TEST REQUESTED	DETECTION LIMIT	RESULTS		FLAG
Phenanthrene	0.454 mg/Kg	<	0.454 mg/Kg	U
Pyrene	0.194 mg/Kg	<	0.194 mg/Kg	U
1-Fluoronapthalene (SS)			6.17 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-1
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP1#
: N1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	< 0.002 mg/Kg	U
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
Bromofluorobenzene (SS)		0.063 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-1
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP1#
: N1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : VHL
ANALYZED ON : 10-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	10.8 mg/Kg	< 10.8 mg/Kg	U
Triacontane (SS)		7.78 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-1
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP1#
: N1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996

MISCELLANEOUS ANALYSES			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	92.6 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221606			

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-2
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP1#
: N1#(36-38')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.41 mg/Kg	< 1.41 mg/Kg	U
Acenaphthylene	1.81 mg/Kg	< 1.81 mg/Kg	U
Anthracene	0.516 mg/Kg	< 0.516 mg/Kg	U
Benzo(a)anthracene	0.0106 mg/Kg	< 0.0106 mg/Kg	U
Benzo(a)pyrene	0.0176 mg/Kg	< 0.0176 mg/Kg	U
Benzo(b)fluoranthene	0.0141 mg/Kg	< 0.0141 mg/Kg	U
Benzo(g,h,i)perylene	0.0587 mg/Kg	< 0.0587 mg/Kg	U
Benzo(k)fluoranthene	0.0129 mg/Kg	< 0.0129 mg/Kg	U
Chrysene	0.117 mg/Kg	< 0.117 mg/Kg	U
Dibenz(a,h)anthracene	0.0235 mg/Kg	< 0.0235 mg/Kg	U
Fluoranthene	0.164 mg/Kg	< 0.164 mg/Kg	U
Fluorene	0.164 mg/Kg	< 0.164 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0352 mg/Kg	< 0.0352 mg/Kg	U
Naphthalene	1.41 mg/Kg	< 1.41 mg/Kg	U

REPORT NUMBER : D96-8694-2
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS				
TEST REQUESTED	DETECTION LIMIT		RESULTS	FLAG
Phenanthrene	0.493 mg/Kg	<	0.493 mg/Kg	U
Pyrene	0.211 mg/Kg	<	0.211 mg/Kg	U
1-Fluoronapthalene (SS)			5.88 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-2
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP1#
: N1#(36-38')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	< 0.002 mg/Kg	U
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
Bromofluorobenzene (SS)		0.072 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-2
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP1#
: N1#(36-38')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 10-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	11.7 mg/Kg	< 11.7 mg/Kg	U
Triacontane (SS)		7.72 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-2
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP1#
: N1#(36-38')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996

MISCELLANEOUS ANALYSES			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	85.2 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221606			

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-3
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP2#
: N1#(6-8')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.33 mg/Kg	< 1.33 mg/Kg	U
Acenaphthylene	1.71 mg/Kg	< 1.71 mg/Kg	U
Anthracene	0.488 mg/Kg	< 0.488 mg/Kg	U
Benzo(a)anthracene	0.0100 mg/Kg	< 0.0100 mg/Kg	U
Benzo(a)pyrene	0.0166 mg/Kg	< 0.0166 mg/Kg	U
Benzo(b)fluoranthene	0.0133 mg/Kg	< 0.0133 mg/Kg	U
Benzo(g,h,i)perylene	0.0554 mg/Kg	< 0.0554 mg/Kg	U
Benzo(k)fluoranthene	0.0122 mg/Kg	< 0.0122 mg/Kg	U
Chrysene	0.111 mg/Kg	< 0.111 mg/Kg	U
Dibenz(a,h)anthracene	0.0222 mg/Kg	< 0.0222 mg/Kg	U
Fluoranthene	0.155 mg/Kg	< 0.155 mg/Kg	U
Fluorene	0.155 mg/Kg	< 0.155 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0333 mg/Kg	< 0.0333 mg/Kg	U
Naphthalene	1.33 mg/Kg	< 1.33 mg/Kg	U

REPORT NUMBER : D96-8694-3
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS				
TEST REQUESTED	DETECTION LIMIT		RESULTS	FLAG
Phenanthrene	0.466 mg/Kg	<	0.466 mg/Kg	U
Pyrene	0.200 mg/Kg	<	0.200 mg/Kg	U
1-Fluoronapthalene (SS)			6.06 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-3
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP2#
: N1#(6-8')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS				
TEST REQUESTED	DETECTION LIMIT		RESULTS	FLAG
Benzene	0.001 mg/Kg	<	0.001 mg/Kg	U
Toluene	0.002 mg/Kg	<	0.002 mg/Kg	U
Ethyl benzene	0.002 mg/Kg	<	0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	<	0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg		0.002 mg/Kg	
Bromofluorobenzene (SS)			0.071 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-3
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP2#
: N1#(6-8')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 C1 /1
ANALYZED BY : MKS
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	< 0.002 mg/Kg	U
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	0.004 mg/Kg	
Bromofluorobenzene (SS)		0.071 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-3
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP2#
: N1#(6-8')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 10-AUG-1996
ANALYSIS METHOD : EPA 8020 C2 /1
ANALYZED BY : MKS
ANALYZED ON : 10-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	< 0.002 mg/Kg	U
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	0.002 mg/Kg	
Bromofluorobenzene (SS)		0.064 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-3
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP2#
: N1#(6-8')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 11-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	11.1 mg/Kg	< 11.1 mg/Kg	U
Triacontane (SS)		7.99 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-3
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP2#
: N1#(6-8')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996

MISCELLANEOUS ANALYSES			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	90.2 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221606			

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-4
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP2#
: N1#(34-36')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.25 mg/Kg	< 1.25 mg/Kg	U
Acenaphthylene	1.61 mg/Kg	< 1.61 mg/Kg	U
Anthracene	0.460 mg/Kg	< 0.460 mg/Kg	U
Benzo(a)anthracene	0.0094 mg/Kg	< 0.0094 mg/Kg	U
Benzo(a)pyrene	0.0157 mg/Kg	< 0.0157 mg/Kg	U
Benzo(b)fluoranthene	0.0125 mg/Kg	< 0.0125 mg/Kg	U
Benzo(g,h,i)perylene	0.0523 mg/Kg	< 0.0523 mg/Kg	U
Benzo(k)fluoranthene	0.0115 mg/Kg	< 0.0115 mg/Kg	U
Chrysene	0.104 mg/Kg	< 0.104 mg/Kg	U
Dibenz(a,h)anthracene	0.0209 mg/Kg	< 0.0209 mg/Kg	U
Fluoranthene	0.146 mg/Kg	< 0.146 mg/Kg	U
Fluorene	0.146 mg/Kg	< 0.146 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0314 mg/Kg	< 0.0314 mg/Kg	U
Naphthalene	1.25 mg/Kg	< 1.25 mg/Kg	U

REPORT NUMBER : D96-8694-4
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Phenanthrene	0.439 mg/Kg	< 0.439 mg/Kg	U
Pyrene	0.188 mg/Kg	< 0.188 mg/Kg	U
1-Fluoronapthalene (SS)		5.21 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-4
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP2#
: N1#(34-36')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	< 0.002 mg/Kg	U
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
Bromofluorobenzene (SS)		0.062 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-4
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP2#
: N1#(34-36')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 11-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	10.4 mg/Kg	< 10.4 mg/Kg	U
Triacontane (SS)		7.82 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-4
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP2#
: N1#(34-36')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996

MISCELLANEOUS ANALYSES			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	95.7 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221606			

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-5
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP3#
: N1#(8-10')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.36 mg/Kg	< 1.36 mg/Kg	U
Acenaphthylene	1.74 mg/Kg	< 1.74 mg/Kg	U
Anthracene	0.497 mg/Kg	< 0.497 mg/Kg	U
Benzo(a)anthracene	0.0102 mg/Kg	0.315 mg/Kg	
Benzo(a)pyrene	0.0170 mg/Kg	0.350 mg/Kg	
Benzo(b)fluoranthene	0.0136 mg/Kg	0.409 mg/Kg	
Benzo(g,h,i)perylene	0.0565 mg/Kg	0.277 mg/Kg	
Benzo(k)fluoranthene	0.0124 mg/Kg	0.186 mg/Kg	
Chrysene	0.113 mg/Kg	0.167 mg/Kg	
Dibenz(a,h)anthracene	0.0226 mg/Kg	0.0328 mg/Kg	
Fluoranthene	0.158 mg/Kg	0.930 mg/Kg	
Fluorene	0.158 mg/Kg	< 0.158 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0339 mg/Kg	0.263 mg/Kg	
Naphthalene	1.36 mg/Kg	< 1.36 mg/Kg	U

REPORT NUMBER : D96-8694-5
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Phenanthrene	0.475 mg/Kg	0.646 mg/Kg	
Pyrene	0.203 mg/Kg	0.643 mg/Kg	
1-Fluoronapthalene (SS)		4.00 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-5
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP3#
: N1#(8-10')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	< 0.002 mg/Kg	U
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
Bromofluorobenzene (SS)		0.066 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-5
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP3#
: N1#(8-10')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 11-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	11.3 mg/Kg	< 11.3 mg/Kg	U
Triacontane (SS)		8.41 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-5
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP3#
: N1#(8-10')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996

MISCELLANEOUS ANALYSES			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	88.5 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221606			

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-6
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP3#
: N1#(42-44')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.27 mg/Kg	< 1.27 mg/Kg	U
Acenaphthylene	1.63 mg/Kg	< 1.63 mg/Kg	U
Anthracene	0.467 mg/Kg	< 0.467 mg/Kg	U
Benzo(a)anthracene	0.0095 mg/Kg	< 0.0095 mg/Kg	U
Benzo(a)pyrene	0.0159 mg/Kg	< 0.0159 mg/Kg	U
Benzo(b)fluoranthene	0.0127 mg/Kg	< 0.0127 mg/Kg	U
Benzo(g,h,i)perylene	0.0531 mg/Kg	< 0.0531 mg/Kg	U
Benzo(k)fluoranthene	0.0117 mg/Kg	< 0.0117 mg/Kg	U
Chrysene	0.106 mg/Kg	< 0.106 mg/Kg	U
Dibenz(a,h)anthracene	0.0212 mg/Kg	< 0.0212 mg/Kg	U
Fluoranthene	0.149 mg/Kg	< 0.149 mg/Kg	U
Fluorene	0.149 mg/Kg	< 0.149 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0319 mg/Kg	< 0.0319 mg/Kg	U
Naphthalene	1.27 mg/Kg	< 1.27 mg/Kg	U

REPORT NUMBER : D96-8694-6
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Phenanthrene	0.446 mg/Kg	< 0.446 mg/Kg	U
Pyrene	0.191 mg/Kg	< 0.191 mg/Kg	U
1-Fluoronapthalene (SS)		4.67 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-6
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP3#
: N1#(42-44')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	< 0.002 mg/Kg	U
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
Bromofluorobenzene (SS)		0.066 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-6
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP3#
: N1#(42-44')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 11-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	10.6 mg/Kg	< 10.6 mg/Kg	U
Triacontane (SS)		7.17 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-6
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP3#
: N1#(42-44')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996

MISCELLANEOUS ANALYSES				
TEST REQUESTED		DETECTION LIMIT	RESULTS	FLAG
Total Solids	/1	0.01 %	94.2 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221606				

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-7
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP4#
: N1#(8-10')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.31 mg/Kg	< 1.31 mg/Kg	U
Acenaphthylene	1.68 mg/Kg	< 1.68 mg/Kg	U
Anthracene	0.479 mg/Kg	< 0.479 mg/Kg	U
Benzo(a)anthracene	0.0098 mg/Kg	0.0120 mg/Kg	
Benzo(a)pyrene	0.0163 mg/Kg	0.0163 mg/Kg	
Benzo(b)fluoranthene	0.0131 mg/Kg	< 0.0131 mg/Kg	U
Benzo(g,h,i)perylene	0.0544 mg/Kg	< 0.0544 mg/Kg	U
Benzo(k)fluoranthene	0.0120 mg/Kg	< 0.0120 mg/Kg	U
Chrysene	0.109 mg/Kg	< 0.109 mg/Kg	U
Dibenz(a,h)anthracene	0.0218 mg/Kg	< 0.0218 mg/Kg	U
Fluoranthene	0.152 mg/Kg	< 0.152 mg/Kg	U
Fluorene	0.152 mg/Kg	< 0.152 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0326 mg/Kg	< 0.0326 mg/Kg	U
Naphthalene	1.31 mg/Kg	< 1.31 mg/Kg	U

Inchcape Testing Services
Environmental Laboratories

REPORT NUMBER : D96-8694-7
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS				
TEST REQUESTED	DETECTION LIMIT	RESULTS		FLAG
Phenanthrene	0.457 mg/Kg	<	0.457 mg/Kg	U
Pyrene	0.196 mg/Kg	<	0.196 mg/Kg	U
1-Fluoronapthalene (SS)			5.82 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-7
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP4#
: N1#(8-10')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 250
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.3 mg/Kg	< 0.3 mg/Kg	DU
Toluene	0.5 mg/Kg	< 0.5 mg/Kg	DU
Ethyl benzene	0.5 mg/Kg	0.8 mg/Kg	D
m,p-Xylene	0.5 mg/Kg	1.6 mg/Kg	D
o-Xylene	0.5 mg/Kg	9.2 mg/Kg	D
Bromofluorobenzene (SS)		24.3 mg/Kg	D

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-7
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP4#
: N1#(8-10')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 C1 /1
ANALYZED BY : MKS
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 250
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.3 mg/Kg	< 0.3 mg/Kg	DU
Toluene	0.5 mg/Kg	< 0.5 mg/Kg	DU
Ethyl benzene	0.5 mg/Kg	0.8 mg/Kg	D
m,p-Xylene	0.5 mg/Kg	4.6 mg/Kg	D
o-Xylene	0.5 mg/Kg	9.2 mg/Kg	D
Bromofluorobenzene (SS)		24.3 mg/Kg	D

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-7
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP4#
: N1#(8-10')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 10-AUG-1996
ANALYSIS METHOD : EPA 8020 C2 /1
ANALYZED BY : MKS
ANALYZED ON : 10-AUG-1996
DILUTION FACTOR : 250
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.3 mg/Kg	< 0.3 mg/Kg	DU
Toluene	0.5 mg/Kg	< 0.5 mg/Kg	DU
Ethyl benzene	0.5 mg/Kg	2.9 mg/Kg	D
m,p-Xylene	0.5 mg/Kg	1.6 mg/Kg	D
o-Xylene	0.5 mg/Kg	6.3 mg/Kg	D
Bromofluorobenzene (SS)		18.8 mg/Kg	D

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-7
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP4#
: N1#(8-10')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 11-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	10.9 mg/Kg	615 mg/Kg	
Triacontane (SS)		8.82 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-7
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP4#
: N1#(8-10')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996

MISCELLANEOUS ANALYSES

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	91.9 %	

Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB
QC Batch No : 0812221606

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-8
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP4#
: N1#(37-39')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.29 mg/Kg	< 1.29 mg/Kg	U
Acenaphthylene	1.66 mg/Kg	< 1.66 mg/Kg	U
Anthracene	0.474 mg/Kg	< 0.474 mg/Kg	U
Benzo(a)anthracene	0.0097 mg/Kg	< 0.0097 mg/Kg	U
Benzo(a)pyrene	0.0162 mg/Kg	< 0.0162 mg/Kg	U
Benzo(b)fluoranthene	0.0129 mg/Kg	< 0.0129 mg/Kg	U
Benzo(g,h,i)perylene	0.0538 mg/Kg	< 0.0538 mg/Kg	U
Benzo(k)fluoranthene	0.0118 mg/Kg	< 0.0118 mg/Kg	U
Chrysene	0.108 mg/Kg	< 0.108 mg/Kg	U
Dibenz(a,h)anthracene	0.0215 mg/Kg	< 0.0215 mg/Kg	U
Fluoranthene	0.151 mg/Kg	< 0.151 mg/Kg	U
Fluorene	0.151 mg/Kg	< 0.151 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0323 mg/Kg	< 0.0323 mg/Kg	U
Naphthalene	1.29 mg/Kg	< 1.29 mg/Kg	U

REPORT NUMBER : D96-8694-8
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS				
TEST REQUESTED	DETECTION LIMIT	RESULTS		FLAG
Phenanthrene	0.452 mg/Kg	<	0.452 mg/Kg	U
Pyrene	0.194 mg/Kg	<	0.194 mg/Kg	U
1-Fluoronapthalene (SS)			3.92 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-8
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP4#
: N1#(37-39')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	< 0.002 mg/Kg	U
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
Bromofluorobenzene (SS)		0.064 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-8
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP4#
: N1#(37-39')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 11-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	10.8 mg/Kg	< 10.8 mg/Kg	U
Triacontane (SS)		7.41 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-8
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP4#
: N1#(37-39')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996

MISCELLANEOUS ANALYSES

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	92.9 %	

Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB
QC Batch No : 0812221607

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-9
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 5
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	7.08 mg/Kg	< 7.08 mg/Kg	DU
Acenaphthylene	9.09 mg/Kg	< 9.09 mg/Kg	DU
Anthracene	2.60 mg/Kg	< 2.60 mg/Kg	DU
Benzo(a)anthracene	0.0531 mg/Kg	1.12 mg/Kg	D
Benzo(a)pyrene	0.0886 mg/Kg	1.06 mg/Kg	D
Benzo(b)fluoranthene	0.0708 mg/Kg	1.14 mg/Kg	D
Benzo(g,h,i)perylene	0.295 mg/Kg	0.932 mg/Kg	D
Benzo(k)fluoranthene	0.0649 mg/Kg	0.518 mg/Kg	D
Chrysene	0.590 mg/Kg	0.677 mg/Kg	D
Dibenz(a,h)anthracene	0.118 mg/Kg	< 0.118 mg/Kg	DU
Fluoranthene	0.826 mg/Kg	3.07 mg/Kg	D
Fluorene	0.826 mg/Kg	< 0.826 mg/Kg	DU
Indeno(1,2,3-cd)pyrene	0.177 mg/Kg	0.936 mg/Kg	D
Naphthalene	7.08 mg/Kg	< 7.08 mg/Kg	DU

REPORT NUMBER : D96-8694-9
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Phenanthrene	2.48 mg/Kg	2.70 mg/Kg	D
Pyrene	1.06 mg/Kg	2.61 mg/Kg	D
1-Fluoronapthalene (SS)		4.97 mg/Kg	D

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-9
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 25
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.03 mg/Kg	< 0.03 mg/Kg	DU
Toluene	0.06 mg/Kg	< 0.06 mg/Kg	DU
Ethyl benzene	0.06 mg/Kg	0.10 mg/Kg	D
m,p-Xylene	0.06 mg/Kg	0.26 mg/Kg	D
o-Xylene	0.06 mg/Kg	0.74 mg/Kg	D
Bromofluorobenzene (SS)		2.34 mg/Kg	D

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-9
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 C1 /1
ANALYZED BY : MKS
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 25
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.03 mg/Kg	< 0.03 mg/Kg	DU
Toluene	0.06 mg/Kg	< 0.06 mg/Kg	DU
Ethyl benzene	0.06 mg/Kg	0.10 mg/Kg	D
m,p-Xylene	0.06 mg/Kg	0.60 mg/Kg	D
o-Xylene	0.06 mg/Kg	0.74 mg/Kg	D
Bromofluorobenzene (SS)		2.34 mg/Kg	D

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-9
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 10-AUG-1996
ANALYSIS METHOD : EPA 8020 C2 /1
ANALYZED BY : MKS
ANALYZED ON : 10-AUG-1996
DILUTION FACTOR : 25
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.03 mg/Kg	< 0.03 mg/Kg	DU
Toluene	0.06 mg/Kg	< 0.06 mg/Kg	DU
Ethyl benzene	0.06 mg/Kg	0.72 mg/Kg	D
m,p-Xylene	0.06 mg/Kg	0.26 mg/Kg	D
o-Xylene	0.06 mg/Kg	1.31 mg/Kg	D
Bromofluorobenzene (SS)		2.27 mg/Kg	D

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-9
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 11-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	11.8 mg/Kg	74.9 mg/Kg	
Triacontane (SS)		9.52 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-9
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996

MISCELLANEOUS ANALYSES			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	84.7 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221607			

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-10
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(23-25')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 5
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	7.15 mg/Kg	< 7.15 mg/Kg	DU
Acenaphthylene	9.18 mg/Kg	< 9.18 mg/Kg	DU
Anthracene	2.62 mg/Kg	< 2.62 mg/Kg	DU
Benzo(a)anthracene	0.0536 mg/Kg	0.657 mg/Kg	D
Benzo(a)pyrene	0.0894 mg/Kg	0.600 mg/Kg	D
Benzo(b)fluoranthene	0.0715 mg/Kg	0.659 mg/Kg	D
Benzo(g,h,i)perylene	0.298 mg/Kg	0.397 mg/Kg	D
Benzo(k)fluoranthene	0.0656 mg/Kg	0.290 mg/Kg	D
Chrysene	0.596 mg/Kg	< 0.596 mg/Kg	DU
Dibenz(a,h)anthracene	0.119 mg/Kg	< 0.119 mg/Kg	DU
Fluoranthene	0.834 mg/Kg	1.81 mg/Kg	D
Fluorene	0.834 mg/Kg	< 0.834 mg/Kg	DU
Indeno(1,2,3-cd)pyrene	0.179 mg/Kg	0.409 mg/Kg	D
Naphthalene	7.15 mg/Kg	< 7.15 mg/Kg	DU

REPORT NUMBER : D96-8694-10
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Phenanthrene	2.50 mg/Kg	< 2.50 mg/Kg	DU
Pyrene	1.07 mg/Kg	1.30 mg/Kg	D
1-Fluoronapthalene (SS)		4.14 mg/Kg	D

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-10
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(23-25')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	0.010 mg/Kg	
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
Bromofluorobenzene (SS)		0.073 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-10
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(23-25')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 C1 /1
ANALYZED BY : MKS
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	0.010 mg/Kg	
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
Bromofluorobenzene (SS)		0.073 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-10
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(23-25')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8020 C2 /1
ANALYZED BY : MKS
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS				
TEST REQUESTED	DETECTION LIMIT		RESULTS	FLAG
Benzene	0.001 mg/Kg	<	0.001 mg/Kg	U
Toluene	0.002 mg/Kg		0.008 mg/Kg	
Ethyl benzene	0.002 mg/Kg	<	0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	<	0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	<	0.002 mg/Kg	U
Bromofluorobenzene (SS)			0.046 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-10
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(23-25')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 11-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	11.9 mg/Kg	313 mg/Kg	
Triacontane (SS)		8.64 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-10
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(23-25')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996

MISCELLANEOUS ANALYSES			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	83.9 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221607			

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-11
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(36-38')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.33 mg/Kg	< 1.33 mg/Kg	U
Acenaphthylene	1.71 mg/Kg	< 1.71 mg/Kg	U
Anthracene	0.488 mg/Kg	< 0.488 mg/Kg	U
Benzo(a)anthracene	0.0100 mg/Kg	< 0.0100 mg/Kg	U
Benzo(a)pyrene	0.0166 mg/Kg	< 0.0166 mg/Kg	U
Benzo(b)fluoranthene	0.0133 mg/Kg	< 0.0133 mg/Kg	U
Benzo(g,h,i)perylene	0.0554 mg/Kg	< 0.0554 mg/Kg	U
Benzo(k)fluoranthene	0.0122 mg/Kg	< 0.0122 mg/Kg	U
Chrysene	0.111 mg/Kg	< 0.111 mg/Kg	U
Dibenz(a,h)anthracene	0.0222 mg/Kg	< 0.0222 mg/Kg	U
Fluoranthene	0.155 mg/Kg	< 0.155 mg/Kg	U
Fluorene	0.155 mg/Kg	< 0.155 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0333 mg/Kg	< 0.0333 mg/Kg	U
Naphthalene	1.33 mg/Kg	< 1.33 mg/Kg	U

REPORT NUMBER : D96-8694-11
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS				
TEST REQUESTED	DETECTION LIMIT		RESULTS	FLAG
Phenanthrene	0.466 mg/Kg	<	0.466 mg/Kg	U
Pyrene	0.200 mg/Kg	<	0.200 mg/Kg	U
1-Fluoronapthalene (SS)			5.27 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-11
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(36-38')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	< 0.002 mg/Kg	U
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
Bromofluorobenzene (SS)		0.065 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-11
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(36-38')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 11-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	11.1 mg/Kg	< 11.1 mg/Kg	U
Triacontane (SS)		7.97 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-11
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(36-38')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996

MISCELLANEOUS ANALYSES				
TEST REQUESTED		DETECTION LIMIT	RESULTS	FLAG
Total Solids	/1	0.01 %	90.2 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221607				

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-12
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP6#
: N1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.43 mg/Kg	< 1.43 mg/Kg	U
Acenaphthylene	1.84 mg/Kg	< 1.84 mg/Kg	U
Anthracene	0.525 mg/Kg	< 0.525 mg/Kg	U
Benzo(a)anthracene	0.0107 mg/Kg	0.0621 mg/Kg	
Benzo(a)pyrene	0.0179 mg/Kg	0.0788 mg/Kg	
Benzo(b)fluoranthene	0.0143 mg/Kg	0.0561 mg/Kg	
Benzo(g,h,i)perylene	0.0597 mg/Kg	< 0.0597 mg/Kg	U
Benzo(k)fluoranthene	0.0131 mg/Kg	0.0334 mg/Kg	
Chrysene	0.119 mg/Kg	< 0.119 mg/Kg	U
Dibenz(a,h)anthracene	0.0239 mg/Kg	< 0.0239 mg/Kg	U
Fluoranthene	0.167 mg/Kg	0.181 mg/Kg	
Fluorene	0.167 mg/Kg	< 0.167 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0358 mg/Kg	0.0633 mg/Kg	
Naphthalene	1.43 mg/Kg	< 1.43 mg/Kg	U

REPORT NUMBER : D96-8694-12
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS				
TEST REQUESTED	DETECTION LIMIT		RESULTS	FLAG
Phenanthrene	0.501 mg/Kg	<	0.501 mg/Kg	U
Pyrene	0.215 mg/Kg	<	0.215 mg/Kg	U
1-Fluoronapthalene (SS)			4.20 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-12
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP6#
: N1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	< 0.002 mg/Kg	U
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
Bromofluorobenzene (SS)		0.074 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-12
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP6#
: N1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 11-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	11.9 mg/Kg	< 11.9 mg/Kg	U
Triacontane (SS)		8.41 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-12
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP6#
: N1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996

MISCELLANEOUS ANALYSES			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	83.8 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221607			

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-13
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP6#
: N1#(35-37')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.26 mg/Kg	< 1.26 mg/Kg	U
Acenaphthylene	1.62 mg/Kg	< 1.62 mg/Kg	U
Anthracene	0.462 mg/Kg	< 0.462 mg/Kg	U
Benzo(a)anthracene	0.0095 mg/Kg	< 0.0095 mg/Kg	U
Benzo(a)pyrene	0.0158 mg/Kg	< 0.0158 mg/Kg	U
Benzo(b)fluoranthene	0.0126 mg/Kg	< 0.0126 mg/Kg	U
Benzo(g,h,i)perylene	0.0525 mg/Kg	< 0.0525 mg/Kg	U
Benzo(k)fluoranthene	0.0116 mg/Kg	< 0.0116 mg/Kg	U
Chrysene	0.105 mg/Kg	< 0.105 mg/Kg	U
Dibenz(a,h)anthracene	0.0210 mg/Kg	< 0.0210 mg/Kg	U
Fluoranthene	0.147 mg/Kg	< 0.147 mg/Kg	U
Fluorene	0.147 mg/Kg	< 0.147 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0315 mg/Kg	< 0.0315 mg/Kg	U
Naphthalene	1.26 mg/Kg	< 1.26 mg/Kg	U

REPORT NUMBER : D96-8694-13
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS				
TEST REQUESTED	DETECTION LIMIT		RESULTS	FLAG
Phenanthrene	0.441 mg/Kg	<	0.441 mg/Kg	U
Pyrene	0.189 mg/Kg	<	0.189 mg/Kg	U
1-Fluoronapthalene (SS)			5.07 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-13
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP6#
: N1#(35-37')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	< 0.002 mg/Kg	U
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
Bromofluorobenzene (SS)		0.062 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-13
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP6#
: N1#(35-37')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 11-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	10.5 mg/Kg	< 10.5 mg/Kg	U
Triacontane (SS)		7.37 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-13
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP6#
: N1#(35-37')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996

MISCELLANEOUS ANALYSES			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	95.2 %	

Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB
QC Batch No : 0812221607

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-14
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP7#
: N1#(20-22')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.25 mg/Kg	< 1.25 mg/Kg	U
Acenaphthylene	1.60 mg/Kg	< 1.60 mg/Kg	U
Anthracene	0.457 mg/Kg	< 0.457 mg/Kg	U
Benzo(a)anthracene	0.0094 mg/Kg	< 0.0094 mg/Kg	U
Benzo(a)pyrene	0.0156 mg/Kg	< 0.0156 mg/Kg	U
Benzo(b)fluoranthene	0.0125 mg/Kg	< 0.0125 mg/Kg	U
Benzo(g,h,i)perylene	0.0520 mg/Kg	< 0.0520 mg/Kg	U
Benzo(k)fluoranthene	0.0114 mg/Kg	< 0.0114 mg/Kg	U
Chrysene	0.104 mg/Kg	< 0.104 mg/Kg	U
Dibenz(a,h)anthracene	0.0208 mg/Kg	< 0.0208 mg/Kg	U
Fluoranthene	0.146 mg/Kg	< 0.146 mg/Kg	U
Fluorene	0.146 mg/Kg	< 0.146 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0312 mg/Kg	< 0.0312 mg/Kg	U
Naphthalene	1.25 mg/Kg	< 1.25 mg/Kg	U

Inchcape Testing Services
Environmental Laboratories

REPORT NUMBER : D96-8694-14
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Phenanthrene	0.437 mg/Kg	< 0.437 mg/Kg	U
Pyrene	0.187 mg/Kg	< 0.187 mg/Kg	U
1-Fluoronapthalene (SS)		5.12 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-14
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP7#
: N1#(20-22')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	0.001 mg/Kg	J
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
Bromofluorobenzene (SS)		0.062 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-14
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP7#
: N1#(20-22')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 11-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	10.4 mg/Kg	< 10.4 mg/Kg	U
Triacontane (SS)		7.01 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-14
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP7#
: N1#(20-22')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996

MISCELLANEOUS ANALYSES			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	96.2 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221607			

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-15
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP7#
: N1#(30-32')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.24 mg/Kg	< 1.24 mg/Kg	U
Acenaphthylene	1.60 mg/Kg	< 1.60 mg/Kg	U
Anthracene	0.456 mg/Kg	< 0.456 mg/Kg	U
Benzo(a)anthracene	0.0093 mg/Kg	< 0.0093 mg/Kg	U
Benzo(a)pyrene	0.0155 mg/Kg	< 0.0155 mg/Kg	U
Benzo(b)fluoranthene	0.0124 mg/Kg	< 0.0124 mg/Kg	U
Benzo(g,h,i)perylene	0.0518 mg/Kg	< 0.0518 mg/Kg	U
Benzo(k)fluoranthene	0.0114 mg/Kg	< 0.0114 mg/Kg	U
Chrysene	0.104 mg/Kg	< 0.104 mg/Kg	U
Dibenz(a,h)anthracene	0.0207 mg/Kg	< 0.0207 mg/Kg	U
Fluoranthene	0.145 mg/Kg	< 0.145 mg/Kg	U
Fluorene	0.145 mg/Kg	< 0.145 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0311 mg/Kg	< 0.0311 mg/Kg	U
Naphthalene	1.24 mg/Kg	< 1.24 mg/Kg	U

REPORT NUMBER : D96-8694-15
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Phenanthrene	0.435 mg/Kg	< 0.435 mg/Kg	U
Pyrene	0.187 mg/Kg	< 0.187 mg/Kg	U
1-Fluoronapthalene (SS)		4.49 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-15
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP7#
: N1#(30-32')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	0.002 mg/Kg	J
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
Bromofluorobenzene (SS)		0.059 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-15
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP7#
: N1#(30-32')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 11-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	10.4 mg/Kg	< 10.4 mg/Kg	U
Triacontane (SS)		7.30 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-15
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP7#
: N1#(30-32')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996

MISCELLANEOUS ANALYSES			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	96.5 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221607			

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-16
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP7#
: N1#(36-38')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS				
TEST REQUESTED	DETECTION LIMIT	RESULTS		FLAG
Acenaphthene	1.46 mg/Kg	<	1.46 mg/Kg	U
Acenaphthylene	1.88 mg/Kg	<	1.88 mg/Kg	U
Anthracene	0.536 mg/Kg	<	0.536 mg/Kg	U
Benzo(a)anthracene	0.0110 mg/Kg	<	0.0110 mg/Kg	U
Benzo(a)pyrene	0.0183 mg/Kg	<	0.0183 mg/Kg	U
Benzo(b)fluoranthene	0.0146 mg/Kg	<	0.0146 mg/Kg	U
Benzo(g,h,i)perylene	0.0609 mg/Kg	<	0.0609 mg/Kg	U
Benzo(k)fluoranthene	0.0134 mg/Kg	<	0.0134 mg/Kg	U
Chrysene	0.122 mg/Kg	<	0.122 mg/Kg	U
Dibenz(a,h)anthracene	0.0244 mg/Kg	<	0.0244 mg/Kg	U
Fluoranthene	0.171 mg/Kg	<	0.171 mg/Kg	U
Fluorene	0.171 mg/Kg	<	0.171 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0365 mg/Kg	<	0.0365 mg/Kg	U
Naphthalene	1.46 mg/Kg	<	1.46 mg/Kg	U

Inchcape Testing Services
Environmental Laboratories

REPORT NUMBER : D96-8694-16
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS				
TEST REQUESTED	DETECTION LIMIT	RESULTS		FLAG
Phenanthrene	0.512 mg/Kg	<	0.512 mg/Kg	U
Pyrene	0.219 mg/Kg	<	0.219 mg/Kg	U
1-Fluoronapthalene (SS)			6.50 mg/Kg	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-16
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP7#
: N1#(36-38')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS						
TEST REQUESTED	DETECTION LIMIT		RESULTS			FLAG
Benzene	0.001	mg/Kg	<	0.001	mg/Kg	U
Toluene	0.002	mg/Kg	<	0.002	mg/Kg	U
Ethyl benzene	0.002	mg/Kg	<	0.002	mg/Kg	U
m,p-Xylene	0.002	mg/Kg	<	0.002	mg/Kg	U
o-Xylene	0.002	mg/Kg	<	0.002	mg/Kg	U
Bromofluorobenzene (SS)				0.072	mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-16
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP7#
: N1#(36-38')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 11-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	12.2 mg/Kg	< 12.2 mg/Kg	U
Triacontane (SS)		8.68 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-16
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP7#
: N1#(36-38')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996

MISCELLANEOUS ANALYSES			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	82.1 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221607			

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-17
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS
ID MARKS : LABQC#
: LB1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 3-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.20 mg/Kg	< 1.20 mg/Kg	U
Acenaphthylene	1.54 mg/Kg	< 1.54 mg/Kg	U
Anthracene	0.440 mg/Kg	< 0.440 mg/Kg	U
Benzo(a)anthracene	0.0090 mg/Kg	< 0.0090 mg/Kg	U
Benzo(a)pyrene	0.0150 mg/Kg	< 0.0150 mg/Kg	U
Benzo(b)fluoranthene	0.0120 mg/Kg	< 0.0120 mg/Kg	U
Benzo(g,h,i)perylene	0.0500 mg/Kg	< 0.0500 mg/Kg	U
Benzo(k)fluoranthene	0.0110 mg/Kg	< 0.0110 mg/Kg	U
Chrysene	0.100 mg/Kg	< 0.100 mg/Kg	U
Dibenz(a,h)anthracene	0.0200 mg/Kg	< 0.0200 mg/Kg	U
Fluoranthene	0.140 mg/Kg	< 0.140 mg/Kg	U
Fluorene	0.140 mg/Kg	< 0.140 mg/Kg	U
Indeno(1,2,3-cd)pyrene	0.0300 mg/Kg	< 0.0300 mg/Kg	U
Naphthalene	1.20 mg/Kg	< 1.20 mg/Kg	U

REPORT NUMBER : D96-8694-17
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Phenanthrene	0.420 mg/Kg	< 0.420 mg/Kg	U
Pyrene	0.180 mg/Kg	< 0.180 mg/Kg	U
1-Fluoronapthalene (SS)		5.06 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-17
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS
ID MARKS : LABQC#
: LB1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 3-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	< 0.001 mg/Kg	U
Toluene	0.002 mg/Kg	< 0.002 mg/Kg	U
Ethyl benzene	0.002 mg/Kg	< 0.002 mg/Kg	U
m,p-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
o-Xylene	0.002 mg/Kg	< 0.002 mg/Kg	U
Bromofluorobenzene (SS)		0.054 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-17
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS
ID MARKS : LABQC#
: LB1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 3-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 10-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	10.0 mg/Kg	< 10.0 mg/Kg	U
Triacontane (SS)		6.39 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-18
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS
ID MARKS : LABQC#
: BS1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 3-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.20 mg/Kg	0.09 mg/Kg	J
Acenaphthylene	1.54 mg/Kg	0.11 mg/Kg	J
Anthracene	0.440 mg/Kg	0.284 mg/Kg	J
Benzo(a)anthracene	0.0090 mg/Kg	0.327 mg/Kg	
Benzo(a)pyrene	0.0150 mg/Kg	0.319 mg/Kg	
Benzo(b)fluoranthene	0.0120 mg/Kg	0.335 mg/Kg	
Benzo(g,h,i)perylene	0.0500 mg/Kg	0.325 mg/Kg	
Benzo(k)fluoranthene	0.0110 mg/Kg	0.333 mg/Kg	
Chrysene	0.100 mg/Kg	0.341 mg/Kg	
Dibenz(a,h)anthracene	0.0200 mg/Kg	0.353 mg/Kg	
Fluoranthene	0.140 mg/Kg	0.313 mg/Kg	
Fluorene	0.140 mg/Kg	0.289 mg/Kg	
Indeno(1,2,3-cd)pyrene	0.0300 mg/Kg	0.317 mg/Kg	
Naphthalene	1.20 mg/Kg	0.08 mg/Kg	J

REPORT NUMBER : D96-8694-18
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Phenanthrene	0.420 mg/Kg	0.293 mg/Kg	J
Pyrene	0.180 mg/Kg	0.304 mg/Kg	
1-Fluoronapthalene (SS)		5.06 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-18
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS
ID MARKS : LABQC#
: BS1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 3-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : RFG
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808802001

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.001 mg/Kg	0.049 mg/Kg	
Toluene	0.002 mg/Kg	0.049 mg/Kg	
Ethyl benzene	0.002 mg/Kg	0.049 mg/Kg	
m,p-Xylene	0.002 mg/Kg	0.101 mg/Kg	
o-Xylene	0.002 mg/Kg	0.047 mg/Kg	
Bromofluorobenzene (SS)		0.056 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-18
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS
ID MARKS : LABQC#
: BS1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 3-AUG-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 10-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	10.0 mg/Kg	72.3 mg/Kg	
Triacontane (SS)		7.10 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-19
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS
ID MARKS : LABQC#
: LR1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 3-AUG-1996

MISCELLANEOUS ANALYSES			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	99.9 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221606#8694-7			

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-20
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS
ID MARKS : LABQC#
: LR2#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996

MISCELLANEOUS ANALYSES			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Solids /1	0.01 %	81.7 %	
Analyzed using ASTM D2216 mod. on 12-AUG-1996 by SAB QC Batch No : 0812221607#8694-16			

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-21
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP1#
: MS1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001#8694-1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.20 mg/Kg	0.20 mg/Kg	J
Acenaphthylene	1.54 mg/Kg	0.17 mg/Kg	J
Anthracene	0.440 mg/Kg	0.268 mg/Kg	J
Benzo(k)fluoranthene	0.0110 mg/Kg	0.293 mg/Kg	
Chrysene	0.100 mg/Kg	0.297 mg/Kg	
Fluorene	0.140 mg/Kg	0.254 mg/Kg	
Naphthalene	1.20 mg/Kg	0.20 mg/Kg	J
Phenanthrene	0.420 mg/Kg	0.250 mg/Kg	J
1-Fluoronapthalene (SS)		4.97 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-21
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP1#
: MS1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : MKS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 5
METHOD FACTOR : 1
QC BATCH NO : 0808802001#8694-1

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.005 mg/Kg	0.241 mg/Kg	D
Toluene	0.010 mg/Kg	0.255 mg/Kg	D
Ethyl benzene	0.010 mg/Kg	0.272 mg/Kg	D
m,p-Xylene	0.010 mg/Kg	0.562 mg/Kg	D
o-Xylene	0.010 mg/Kg	0.267 mg/Kg	D
Bromofluorobenzene (SS)		0.285 mg/Kg	D

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-21
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP1#
: MS1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 10-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801502#8694-1

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	10.0 mg/Kg	72.7 mg/Kg	
Triacontane (SS)		7.33 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-22
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP1#
: SD1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : PSS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0808831001#8694-1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.20 mg/Kg	0.22 mg/Kg	J
Acenaphthylene	1.54 mg/Kg	0.18 mg/Kg	J
Anthracene	0.440 mg/Kg	0.288 mg/Kg	J
Benzo(k)fluoranthene	0.0110 mg/Kg	0.307 mg/Kg	
Chrysene	0.100 mg/Kg	0.316 mg/Kg	
Fluoranthene	0.140 mg/Kg	0.305 mg/Kg	
Fluorene	0.140 mg/Kg	0.274 mg/Kg	
Naphthalene	1.20 mg/Kg	0.19 mg/Kg	J
Phenanthrene	0.420 mg/Kg	0.279 mg/Kg	J
1-Fluoronapthalene (SS)		5.57 mg/Kg	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-22
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP1#
: SD1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : MKS
PREPARED ON : 8-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 5
METHOD FACTOR : 1
QC BATCH NO : 0808802001#8694-1

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	0.005 mg/Kg	0.232 mg/Kg	D
Toluene	0.010 mg/Kg	0.245 mg/Kg	D
Ethyl benzene	0.010 mg/Kg	0.261 mg/Kg	D
m,p-Xylene	0.010 mg/Kg	0.538 mg/Kg	D
o-Xylene	0.010 mg/Kg	0.256 mg/Kg	D
Bromofluorobenzene (SS)		0.291 mg/Kg	D

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8694-22
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP1#
: SD1#(14-16')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 31-JUL-1996
PREPARATION METHOD : EPA 3550A
PREPARED BY : GWG
PREPARED ON : 9-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 10-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0809801502#8694-1

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	10.0 mg/Kg	64.7 mg/Kg	
Triacontane (SS)		6.68 mg/Kg	

Results are reported on Dry Weight basis.

DESCRIPTION OF REPORTING FLAGS

U - Indicates compound was analyzed for but not detected.

J - Indicates an estimated value. This flag is used if the compound is detected but is below the Reporting Limit.

D - Indicates all compounds in an analysis at a secondary dilution.

N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds where the identification is based on a mass spectral library search.

E - Indicates the compounds whose concentration exceed the limit of the instrument or the Laboratory Information Management System. The concentration will be greater than the concentration listed.

Q - Indicates the surrogate recovery is outside the defined QC limits.

M - Indicates the matrix has interfered with the recovery of the surrogates.

O - Indicates the surrogate was lost because of dilution.

Inchcape Testing Services
Environmental Laboratories

QC SUMMARY

Inchcape Testing Services
Environmental Laboratories

1089 E. Collins Blvd.
Richardson, TX 75081
Tel. 214-238-5591
Fax. 214-238-5592

REPORT DATE : 27-AUG-1996 REPORT NUMBER : D96-8694

SAMPLE SUBMITTED BY : Parsons Engineering Science
ATTENTION : Mr. Steve Ratzlaff

LABORATORY QUALITY CONTROL REPORT

ANALYTE	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene
BATCH NO.	0808831001	0808831001	0808831001	0808831001	0808831001
LCS LOT NO.	AB604-83	AB604-83	AB604-83	AB604-83	AB604-83
PREP METHOD	EPA 3550A	EPA 3550A	EPA 3550A	EPA 3550A	EPA 3550A
PREPARED BY	PSS	PSS	PSS	PSS	PSS
ANALYSIS METHOD	EPA 8310 PR	EPA 8310 PR	EPA 8310 PR	EPA 8310 PR	EPA 8310 PR
ANALYZED BY	JXA	JXA	JXA	JXA	JXA
UNITS	µg/Kg	µg/Kg	µg/Kg	µg/Kg	µg/Kg
METHOD BLANK	< 67.0	< 67.0	< 121.	< 14.1	< 42.8
SPIKE LEVEL	334	334	334	334	334
SPK REC LIMITS	10.0 - 122	10.0 - 139	10.0 - 124	10.0 - 142	10.0 - 142
SPK RPD LIMITS	41.0	45.0	40.0	43.0	43.0
MS RESULT	60.4	93.0	81.5	274	264
MS RECOVERY %	18.1	27.8	24.4	82.0	79.0
MSD RESULT	57.1	112	79.6	299	288
MSD RECOVERY %	17.1	33.5	23.8	89.5	86.2
MS/MSD RPD %	5.62	18.5	2.36	8.73	8.70
BS RESULT	NA	NA	NA	NA	NA
BS RECOVERY %	NA	NA	NA	NA	NA
BSD RESULT	NA	NA	NA	NA	NA
BSD RECOVERY %	NA	NA	NA	NA	NA
BS/BSD RPD %	NA	NA	NA	NA	NA
DUP RPD LIMITS	---	---	---	---	---
DUPLICATE RPD %	NA	NA	NA	NA	NA
LCS LEVEL	334	334	334	334	334
LCS REC LIMITS	10.0 - 122	10.0 - 139	10.0 - 124	10.0 - 142	10.0 - 142
LCS RESULT	76.8	105	86.1	289	293
LCS RECOVERY %	23.0	31.4	25.8	86.5	87.7
SPIKE SAMPLE ID	8694-1	8694-1	8694-1	8694-1	8694-1
SAMPLE VALUE	< 67.0	< 67.0	< 121	< 14.1	< 42.8
DUP SAMPLE ID	---	---	---	---	---
DUP SAMPLE VAL/1	---	---	---	---	---
DUP SAMPLE VAL/2	---	---	---	---	---

NA Not applicable

Inchcape Testing Services
Environmental Laboratories

1089 E. Collins Blvd.
Richardson, TX 75081
Tel. 214-238-5591
Fax. 214-238-5592

REPORT DATE : 27-AUG-1996 REPORT NUMBER : D96-8694

SAMPLE SUBMITTED BY : Parsons Engineering Science
ATTENTION : Mr. Steve Ratzlaff

LABORATORY QUALITY CONTROL REPORT

ANALYTE	Anthracene	Chrysene	Benzo(k)fluoranthene	Benzene	Ethylbenzene
BATCH NO.	0808831001	0808831001	0808831001	0808802001	0808802001
LCS LOT NO.	AB604-83	AB604-83	AB604-83	AB709-39A	AB709-39A
PREP METHOD	EPA 3550A	EPA 3550A	EPA 3550A	EPA 5030	EPA 5030
PREPARED BY	PSS	PSS	PSS	RFG	RFG
ANALYSIS METHOD	EPA 8310 PR	EPA 8310 PR	EPA 8310 PR	EPA 8020 PR	EPA 8020 PR
ANALYZED BY	JXA	JXA	JXA	MKS	MKS
UNITS	µg/Kg	µg/Kg	µg/Kg	mg/Kg	mg/Kg
METHOD BLANK	< 44.2	< 10.1	< 11.4	< 0.001	<0.002
SPIKE LEVEL	334	334	334	0.250	0.250
SPK REC LIMITS	10.0 - 126	10.0 - 199	10.0 - 159	70.0 - 130	70.0 - 130
SPK RPD LIMITS	29.0	42.0	50.0	25.0	25.0
MS RESULT	263	312	306	0.241	0.272
MS RECOVERY %	78.7	93.4	91.6	96.4	109
MSD RESULT	284	334	324	0.232	0.261
MSD RECOVERY %	85.0	100	97.0	92.8	104
MS/MSD RPD %	7.68	6.81	5.71	3.81	4.13
BS RESULT	NA	NA	NA	NA	NA
BS RECOVERY %	NA	NA	NA	NA	NA
BSD RESULT	NA	NA	NA	NA	NA
BSD RECOVERY %	NA	NA	NA	NA	NA
BS/BSD RPD %	NA	NA	NA	NA	NA
DUP RPD LIMITS	---	---	---	---	---
DUPLICATE RPD %	NA	NA	NA	NA	NA
LCS LEVEL	334	334	334	0.0500	0.0500
LCS REC LIMITS	10.0 - 126	10.0 - 199	10.0 - 159	70.0 - 130	70.0 - 130
LCS RESULT	284	341	335	0.0490	0.0490
LCS RECOVERY %	85.0	102	100	98.0	98.0
SPIKE SAMPLE ID	8694-1	8694-1	8694-1	8694-1	8694-1
SAMPLE VALUE	< 44.2	< 10.1	< 11.4	< 0.00100	< 0.00200
DUP SAMPLE ID	---	---	---	---	---
DUP SAMPLE VAL/1	---	---	---	---	---
DUP SAMPLE VAL/2	---	---	---	---	---

NA Not applicable

Inchcape Testing Services
Environmental Laboratories

1089 E. Collins Blvd.
Richardson, TX 75081
Tel. 214-238-5591
Fax. 214-238-5592

REPORT DATE : 27-AUG-1996 REPORT NUMBER : D96-8694

SAMPLE SUBMITTED BY : Parsons Engineering Science
ATTENTION : Mr. Steve Ratzlaff

LABORATORY QUALITY CONTROL REPORT

ANALYTE	Toluene	m,p-Xylenes	o-Xylene	Total Extractable Hydrocarbons
BATCH NO.	0808802001	0808802001	0808802001	0809801503
LCS LOT NO.	AB709-39A	AB709-39A	AB709-39A	AB604-86B
PREP METHOD	EPA 5030	EPA 5030	EPA 5030	EPA 3550A
PREPARED BY	RFG	RFG	RFG	GWG
ANALYSIS METHOD	EPA 8020 PR	EPA 8020 PR	EPA 8020 PR	EPA 8015M
ANALYZED BY	MKS	MKS	MKS	MTW
UNITS	mg/Kg	mg/Kg	mg/Kg	mg/Kg
METHOD BLANK	<0.002	<0.002	<0.002	< 2.00000
SPIKE LEVEL	0.250	0.500	0.250	83.3
SPK REC LIMITS	70.0 - 130	70.0 - 130	70.0 - 130	51.0 - 153
SPK RPD LIMITS	25.0	25.0	25.0	50.0
MS RESULT	0.255	0.562	0.267	72.7
MS RECOVERY %	102	112	107	87.3
MSD RESULT	0.245	0.538	0.256	64.7
MSD RECOVERY %	98.0	108	102	77.7
MS/MSD RPD %	4.00	4.36	4.21	11.6
BS RESULT	NA	NA	NA	72.3
BS RECOVERY %	NA	NA	NA	86.8
BSD RESULT	NA	NA	NA	67.2
BSD RECOVERY %	NA	NA	NA	80.7
BS/BSD RPD %	NA	NA	NA	7.31
DUP RPD LIMITS	---	---	---	---
DUPLICATE RPD %	NA	NA	NA	NA
LCS LEVEL	0.0500	0.100	0.0500	---
LCS REC LIMITS	70.0 - 130	70.0 - 130	70.0 - 130	---
LCS RESULT	0.0490	0.101	0.0470	SEE_BS
LCS RECOVERY %	98.0	101	94.0	SEE_BS
SPIKE SAMPLE ID	8694-1	8694-1	8694-1	8694-1
SAMPLE VALUE	< 0.00200	< 0.00200	< 0.00200	< 2.00
DUP SAMPLE ID	---	---	---	---
DUP SAMPLE VAL/1	---	---	---	---
DUP SAMPLE VAL/2	---	---	---	---

NA Not applicable
SEE_BS LCS and LCS Duplicate reported as BS and BSD.

GROUNDWATER SAMPLE ANALYTICAL RESULTS

Inchcape Testing Services
Environmental Laboratories

CUSTOMER: PARSONS ENGINEERING SCIENCE
PROJECT: 726876.65122 Building 173 RAFB

REPORT NUMBER: D96-8676
SAMPLES RECEIVED: 3-August-1996

Inchcape Testing Services
Environmental Laboratories

TABLE OF CONTENTS
(D96-8676)

Inchcape Testing Services
Environmental Laboratories

CASE NARRATIVE

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED: 3-AUG-1996

REPORT NUMBER: D96-8676
REPORT DATE: 21-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc.
ADDRESS : 57 Executive Park, Suite #300
Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

PROJECT : 726876.65122 Building 173 RAFB

DATE SAMPLED : 2-August-1996

SDG NARRATIVE

This is a Level III data package, containing CLP-like forms for the analysis of volatile organics, polynuclear aromatic hydrocarbons and total petroleum hydrocarbons. These analyses have been completed by U.S. Environmental Protection Agency SW846 (RCRA) and ASTM criteria.

EPA Method 8020 modified Volatiles Analysis

Second Column Confirmation

Since all environmental samples were non-detected for all target analytes, no second column confirmations were required.

EPA Method 8310 Polynuclear Aromatic Hydrocarbons Analysis

Matrix Spike Analysis

In the reporting of sample D96-8676-6 (blank spike), a method factor of 0.1 was employed, because some of the spiking compounds were introduced at concentrations below the reporting limits. This resulted in a lowering of the reporting limits by a factor of 10.

EPA Method 8015M Total Extractable Petroleum Hydrocarbons Analysis

Matrix Spike Analysis

Due to limited sample availability, the matrix spike/matrix spike duplicate analyses were conducted using fortified reagent water. Therefore, these analyses are reported as blank spike/blank spike duplicate analyses.

No further observations were documented during the sample analysis for this task.

Please refer to the attached Case Narrative Summary for sample identifications and analytical requests.

Sample calculations are attached to this SDG narrative.

If there are any questions, feel free to contact Ms. Jacqueline Mayhew, at (214) 238-5591.

Alan Humason

Alan Humason
QA Coordinator

Inchcape Testing Services
Environmental Laboratories

JOB ID : D96-8676
CUSTOMER : Parsons Engineering Science
PROJECT : 726876.65122 Building 173 RAFB

SAMPLE ID : D96-8676-1 DATE SAMPLED : 2-AUG-1996
ID MARKS : RAFB-GP3A# N1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310L /1	HCS	7-AUG-1996	JXA	20-AUG-1996	0807831001
RBN_BTXL /1	CNA	13-AUG-1996	VHT	14-AUG-1996	0813802002
TEH_8015UL /1	HCS	7-AUG-1996	MTW	9-AUG-1996	0807801503

SAMPLE ID : D96-8676-2 DATE SAMPLED : 2-AUG-1996
ID MARKS : RAFB-GP9# N1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310L /1	HCS	7-AUG-1996	JXA	20-AUG-1996	0807831001
RBN_BTXL /1	CNA	13-AUG-1996	VHT	14-AUG-1996	0813802002
TEH_8015UL /1	HCS	7-AUG-1996	MTW	9-AUG-1996	0807801503

SAMPLE ID : D96-8676-3 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-RSW# N1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310L /1	HCS	7-AUG-1996	JXA	20-AUG-1996	0807831001
RBN_BTXL /1	CNA	13-AUG-1996	VHT	14-AUG-1996	0813802002
TEH_8015UL /1	HCS	7-AUG-1996	MTW	9-AUG-1996	0807801503

SAMPLE ID : D96-8676-4 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-RSS# N1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310L /1	HCS	7-AUG-1996	JXA	20-AUG-1996	0807831001
RBN_BTXL /1	CNA	13-AUG-1996	VHT	14-AUG-1996	0813802002
TEH_8015UL /1	HCS	7-AUG-1996	MTW	9-AUG-1996	0807801503

JOB ID : D96-8676
CUSTOMER : Parsons Engineering Science
PROJECT : 726876.65122 Building 173 RAFB

SAMPLE ID : D96-8676-5 DATE SAMPLED : 3-AUG-1996
ID MARKS : LABQC# LB1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310L /1	HCS	7-AUG-1996	JXA	20-AUG-1996	0807831001
RBN_BTXL /1	CNA	13-AUG-1996	VHT	14-AUG-1996	0813802002
TEH_8015UL /1	HCS	7-AUG-1996	MTW	8-AUG-1996	0807801503

SAMPLE ID : D96-8676-6 DATE SAMPLED : 3-AUG-1996
ID MARKS : LABQC# BS1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310L /1	HCS	7-AUG-1996	JXA	20-AUG-1996	0807831001
RBN_BTXL /1	CNA	13-AUG-1996	VHT	14-AUG-1996	0813802002
TEH_8015UL /1	HCS	7-AUG-1996	MTW	8-AUG-1996	0807801503

SAMPLE ID : D96-8676-7 DATE SAMPLED : 3-AUG-1996
ID MARKS : LABQC# BD1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
TEH_8015UL /1	HCS	7-AUG-1996	MTW	9-AUG-1996	0807801503

SAMPLE ID : D96-8676-8 DATE SAMPLED : 1-AUG-1996
ID MARKS : FIELDQC# TB1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN_BTXL /1	CNA	13-AUG-1996	VHT	14-AUG-1996	0813802002

SAMPLE ID : D96-8676-9 DATE SAMPLED : 2-AUG-1996
ID MARKS : FIELDQC# TB1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN_BTXL /1	CNA	13-AUG-1996	VHT	14-AUG-1996	0813802002

JOB ID :	D96-8676
CUSTOMER :	Parsons Engineering Science
PROJECT :	726876.65122 Building 173 RAFB

SAMPLE ID : D96-8676-10 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-RSS# MS1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310L /1	HCS	7-AUG-1996	JXA	9-AUG-1996	0807831001#8676-4

SAMPLE ID : D96-8676-11 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-RSS# SD1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
RBN8310L /1	HCS	7-AUG-1996	JXA	9-AUG-1996	0807831001#8676-4

ANALYSIS	DESCRIPTION
RBN8310L	IRPIMS PAH for Bioventing Project, Liquid
RBN_BTXL	IRPIMS BTEX for Bioventing Project, Liquid
TEH_8015UL	Total Extractable HC, Liquid, µg/L

GC ANALYSIS, WATER

Formulas used for calculations

$$\text{Concentration } (\mu g/L) = \frac{(A_x)(I_s)(V_t)(Df)}{(A_{is})(RRF)(V_o)(V_i)}$$

Where:

A_x	=	Area of the peak for the compound to be measured.
A_{is}	=	Area of the peak for the internal standard.
I_s	=	Amount of internal standard injected in nanograms (ng).
V_o	=	Volume of water extracted in milliliters (mL).
V_i	=	Volume of extract injected (μL).
V_t	=	Volume of concentrated extract in microliters (μL).
Df	=	Dilution factor. (see below)
RRF	=	Relative response factor. (see below)

Dilution factor =

$$\frac{\mu L \text{ most conc. extract used to make dilution} + \mu L \text{ clean solvent}}{\mu L \text{ most conc. extract used to make dilution}}$$

If no dilution is performed, Df = 1.0

$$\text{Relative Response Factor} = \frac{A_x}{A_{is}} \times \frac{C_{is}}{C_x}$$

A_x	=	Area of the peak for the compound to be measured.
A_{is}	=	Area of the peakfor the specific internal standard.
C_{is}	=	Concentration of the internal standard (μg/mL).
C_x	=	Concentration of the compound to be measured (μg/mL).

HPLC ANALYSIS, WATER

Formulas used for calculations

$$\text{Concentration } (\mu g/L) = \frac{(A_x)(V_t)(Df)}{(CF)(V_o)(V_i)}$$

Where:

A_x = Area of the peak for the compound to be measured.
V_t = Volume of the concentrated extract in microliters (μL).
V_o = Volume of water extracted in milliliters (mL).
V_i = Volume of extract injected onto each column in microliters (μL).
Df = Dilution factor. (see below)
CF = Average calibration factor (see below)

Dilution factor =

$$\frac{\mu L \text{ most conc. extract used to make dilution} + \mu L \text{ clean eluent}}{\mu L \text{ most conc. extract used to make dilution}}$$

If no dilution is performed, Df = 1.0

$$\text{Calibration Factor} = \frac{\text{Peak Area (or Height) of the Standard}}{\text{Mass Injected (ng)}}$$

CHAIN OF CUSTODY

[redacted] Inc[redacted]pe [redacted]ting [redacted]rvices Environmental Laboratories 1[redacted] East Co[redacted] Blvd., [redacted] Richardson, TX [redacted] (21[redacted] 238-559[redacted] CHAI[redacted]F C[redacted]ODY [redacted]COR[redacted]

Report to:		Invoice to	
Company:	PARSONS ES	Company:	SAME
Address:	57 EXECUTIVE PARK, S	Address:	
SUITE 500	ATLANTA, GA 30329		
Contact:	STEVE RATZLAFF	Contact:	
Phone:	404-235-2361	Phone:	
Fax:	404-235-2350	PO/SO #:	726876.65122

Sampler's Name: STEVE RATZLAFF

Sampler's Signature: [signature]

Proj. No.:

Project Name: BUILDING 173, ROBINS AFB

ANALYSIS REQUESTED: BTEX SW 8020; PAH SW 8310; TPH-DRO SW 8015

Lab use only
Due Date: 01

Temp. of coolers when received (C°): 1 4 | 2 | 3 | 4 | 5

Custody Seal N/Y

Intact N/Y

Screened For Radioactivity ☐

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	VOA	A/G 1 Lt.	250 ml	P/O	BTEX SW 8020	PAH SW 8310	TPH-DRO SW 8015	Lab Sample ID (Lab Use Only)
W	8/2/96	1125		X	080296-RAFB-GP3A-GW	2	3			X	X	X	8676-1
W	8/2/96	1200		X	080296-RAFB-GP9-GW	2	3			X	X	X	2
WSR													

Turn around time ☒ Priority 1 or Standard ☐ Priority 2 or 50% ☐ Priority 3 or 100% ☐ Priority 4 ERS *

* BTEX (602/8020), TPH (418.1 or 8015), VOLATILES (624/8240), IGNITABILITY, TOTAL LEAD (6010)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	8/2/96	1320	David Meyer	8/3/96	1000
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Remarks

ORIGINAL

Client's delivery of samples constitutes acceptance of Inchcape/ITS-Dallas terms and conditions contained in the Price Schedule.

[1] Matrix: WW - Wastewater, W - Water, S - Soil, SD - Solid, L - Liquid, A - Air Bag, C - Charcoal tube, SL - Sludge, O - Oil

[2] Container: VOA - 40 ml vial, A/G - Amber / Or Glass 1 Liter, 250 ml - Glass wide mouth, P/O - Plastic or other

Inchcape cannot accept verbal changes. Please Fax written changes to 214-238-5592

OFFICE USE ONLY

Inchcape Testing Services — Dallas

1089 East Collins Blvd., Richardson, TX 75081 (214) 238-5591

CHAIN OF CUSTODY RECORD

Report to:
Company: Parsons ES
Address: 57 Executive Park S.
Atlanta GA 30329
Contact: Steve Ratzlaff
Phone: 404 235-2361
Fax: 404 235-2500

Invoice to
Company: SAME
Address:
Contact:
Phone:
PO/SO #:

Sampler's Name: Greg Hedrick
Sampler's Signature: [signature]

Lab use only
Due Date:
Temp. of coolers when received (C°): 1 4 | 2 | 3 | 4 | 5
Custody Seal N / Y
Intact N / Y
Screened For Radioactivity ☒

Proj. No.:
Project Name:

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	VOA	A/G 1 Lt.	250 ml	P/O	BTEX 8020	PAH 8310	TPH-DRO 8015								Lab Sample ID (Lab Use Only)
W	8/1	0730			080196-RAFB-RSW	2	3			X	X	X								8676-3
W	8/1	0745			080196-RAFB-RSS	2	3			X	X	X								4

Turn around time: ☒ Priority 1 or Standard ☐ Priority 2 or 50% ☐ Priority 3 or 100% ☐ Priority 4 ERS *

* BTEX (602/8020), TPH (418.1 or 8015), VOLATILES (624/8240), IGNITABILITY, TOTAL LEAD (6010)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	8/2	1445	[signature]	8/3/96	1000

Remarks:

Client's delivery of samples constitutes acceptance of Inchcape/ITS-Dallas terms and conditions contained in the Price Schedule.

[1] Matrix: WW - Wastewater, W - Water, S - Soil, SD - Solid, L - Liquid, A - Air Bag, C - Charcoal tube, SL - Sludge, O - Oil
[2] Container: VOA - 40 ml vial, A/G - Amber / Or Glass 1 Liter, 250 ml - Glass wide mouth, P/O - Plastic or other

ITS - Dallas cannot accept verbal changes. Please Fax written changes to 214-238-5592

OFFICE USE ONLY

[redacted] Inc[redacted]pe [redacted]ting [redacted]rvices [redacted] Environmental Laboratories [redacted] 10[redacted] East Co[redacted] Blvd., [redacted] Richardson, TX [redacted] (21[redacted]) [redacted]-5591 [redacted] CHAIN [redacted]F C[redacted]ODY [redacted]ECORD

Report to:		Invoice to	
Company:	Parsons	Company:	
Address:	57 Executive Park #500	Address:	
Contact:	Steve Rutzlaff	Contact:	
Phone:		Phone:	
Fax:		PO/SO #:	

Sampler's Name

Sampler's Signature

Proj. No.

Project Name

ANALYSIS REQUESTED: BTEX, 8310, DRO TPH

Lab use only
Due Date:

Temp. of coolers when received (C°): 1 | 2 | 3 | 4 | 5

Custody Seal N / Y
Intact N / Y
Screened For Radioactivity ☐

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	VOA	A/G 1 Lt.	250 ml	P/O	BTEX	8310	DRO TPH									Lab Sample ID (Lab Use Only)
WQ					LB1					X	X	X									8676-5
WQ					BS1					↓	↓	↓									6
WQ					~~001~~					↓	↓	↓									~~7~~ SOM
	8/1				Trip Blank					X											8
	8/2				Trip Blank SOM Added Not on COC					X											9

Turn around time ☐ Priority 1 or Standard ☐ Priority 2 or 50% ☐ Priority 3 or 100% ☐ Priority 4 ERS * * BTEX (602/8020), TPH (418.1 or 8015), VOLATILES (624/8240), IGNITABILITY, TOTAL LEAD (6010)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:	Remarks
			[signature]	8/3/96	1000	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:	Client's delivery of samples constitutes acceptance of Inchcape/ITS-Dallas terms and conditions contained in the Price Schedule.

[1] Matrix WW - Wastewater W - Water S - Soil SD - Solid L - Liquid A - Air Bag C - Charcoal tube SL - Sludge O - Oil
[2] Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other

Inchcape cannot accept verbal changes. Please Fax written changes to 214-238-5592

OFFICE USE ONLY

COOLER RECEIPT FORM

Date Received: 8/3/96 Project: 726876.65122 Robins AFB

Date Logged-in: 8/3/96 Received by: [signature]

1	Shipping slip. If yes, carrier and bill number: FED EX 901599 5063	Yes	No
2	Custody seals on cooler. If yes, how many and where: 1 on front	Yes	No
3	Custody seals intact.	Yes	No
4	Chain of Custody in plastic.	Yes	No
5	Chain of Custody filled out properly.	Yes	No
6	Client signed Chain of Custody.	Yes	No
7	Samples shipped on ice. If no, temperature of cooler:	Yes	No
8	All bottles sealed.	Yes	~~No~~ om
9	All bottles received intact.	Yes	No
10	Labels in good condition and complete.	Yes	No
11	Sample labels agree with Chain of Custody.	Yes	No
12	Correct containers used.	Yes	No
13	Correct preservative used.	Yes	No
14	Sufficient sample provided.	Yes	No
15	Bubbles absent from VOA.	Yes	No
16	Comments (use corrective action form if necessary):		

INCHCAPE TESTING SERVICES
Dallas

SAMPLE PRESERVATION INFORMATION SHEET

Preserved By	KRH	JOB NUMBER	8676
Date	8-7-96		
Time		Client Name	Parsons

Batch A

Sample No.	Container Type	Apparent Volume (mLs)	Initial pH* (20± 2°C)	Final pH	Preservative Added	Filtration	Comments
8676-1	2AG	1L	4.8	4.8	8		NP
-1	1AG			<2	4		TPH
-2	2AG		4.6	4.6	8		NP
-2	1AG			<2	4		TPH
-3	2AG		4.9	4.9	8		NP
-3	1AG			<2	4		TPH
				Batch B			
-4	2AG	1L	5.1	5.1	8		NP
-4	1AG			<2	4		TPH

KRH

pH Duplicate (maximum difference = 0.2): Sample No. 8676-1	4.8	**PRESERVATIVE / FILTRATION KEY** 1 = Pre-preserved 2 = H_2SO_4 to pH<2 3 = HNO_3 to pH<2 4 = HCl to pH<2	5 = NaOH to pH>12 6 = $Na_2S_2O_3$ (0.008%) 7 = 2 mL ZnOAc/NaOH to pH>12 8 = No Preservative Required
pH LCS (pH = 7.0 ± 0.2): Lot Number: E100	7.0	F = Chain-of-Custody indicates sample was filtered in the field L = Sample filtered (0.45 pm) in the laboratory before preservation	

* The initial pH is determined in accordance with EPA methods 150.1 / SW-846 9040 using a sample aliquot which has been adjusted to 20 ± 2°C

1089 East Collins Blvd. • Richardson TX 75081 • (214) 238-5591 • Fax (214) 238-5592

Inchcape Testing Services
Environmental Laboratories

1089 E. Collins Blvd.
Richardson, TX 75081
Tel. 214-238-5591
Fax. 214-238-5592

9015995063

8/2/96 0300-0641-0

Greg Wrenrick 404-235-2300

Trip Blank PARSONS ENGINEERING SCIENCE X

Trip Blank Added ... 5 STE 500 X

ATLANTA Not on COC GA 30329

726576.65127

X

James McKittrick 214 238-5591

Inchcape Testing Services X

1089 E. Collins Blvd

Richardson	TX	75081

104 200 5 ... 0401 0030

7

8

9

8676-86

3 168

9 0 1 5 9 9 5 0 6 3

232

WCSL 1295
Rev. Date 10/95 • PART #147381

Inchcape Testing Services
NDRC Laboratories

1089 E. Collins Blvd.
Richardson, TX 75081
Tel. 214-238-5591
Fax. 214-238-5592

ANALYTICAL RESULTS

Inchcape Testing Services
Environmental Laboratories

1089 E. Collins Blvd.
Richardson, TX 75081
Tel. 214-238-5591
Fax. 214-238-5592

ANALYTICAL REPORT

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676
REPORT DATE : 21-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff
PROJECT : 726876.65122 Building 173 RAFB

Included in this data package are the analytical results for the sample group which you have submitted to Inchcape Testing Services for analysis. These results are representative of the samples as received by the laboratory.

The information contained herein has undergone extensive review and is deemed accurate and complete. Sample analysis and quality control were performed in accordance with all applicable protocols. Any deviations from these protocols or observations of interest are detailed in an accompanying Case Narrative. Please refrain from reproducing this report except in its entirety.

If you have any questions regarding this report and its associated materials please call your Project Manager at (214) 238-5591.

We appreciate the opportunity to serve you and look forward to providing continued service in the future.

Martin Jeffus

Martin Jeffus
General Manager

DATE RECEIVED : 3-AUG-1996
REPORT NUMBER : D96-8676-1
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Ground Water for IRPIMS
ID MARKS : RAFB-GP3A#
: N1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 3510B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0807831001

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	18.0 µg/L	< 18.0 µg/L	U
Acenaphthylene	23.0 µg/L	< 23.0 µg/L	U
Anthracene	6.60 µg/L	< 6.60 µg/L	U
Benzo(a)anthracene	0.130 µg/L	< 0.130 µg/L	U
Benzo(a)pyrene	0.120 µg/L	< 0.120 µg/L	U
Benzo(b)fluoranthene	0.180 µg/L	< 0.180 µg/L	U
Benzo(g,h,i)perylene	0.760 µg/L	< 0.760 µg/L	U
Benzo(k)fluoranthene	0.170 µg/L	< 0.170 µg/L	U
Chrysene	1.50 µg/L	< 1.50 µg/L	U
Dibenz(a,h)anthracene	0.300 µg/L	< 0.300 µg/L	U
Fluoranthene	2.10 µg/L	< 2.10 µg/L	U
Fluorene	2.10 µg/L	< 2.10 µg/L	U
Indeno(1,2,3-cd)pyrene	0.430 µg/L	< 0.430 µg/L	U
Naphthalene	18.0 µg/L	< 18.0 µg/L	U

Inchcape Testing Services
Environmental Laboratories

REPORT NUMBER : D96-8676-1
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Phenanthrene	6.40 µg/L	< 6.40 µg/L	U
Pyrene	2.70 µg/L	< 2.70 µg/L	U
1-Fluoronapthalene (SS)		188 µg/L	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-1
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Ground Water for IRPIMS
ID MARKS : RAFB-GP3A#
: N1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : CNA
PREPARED ON : 13-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : VHT
ANALYZED ON : 14-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0813802002

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	2.0 µg/L	< 2.0 µg/L	U
Toluene	2.0 µg/L	< 2.0 µg/L	U
Ethyl benzene	2.0 µg/L	< 2.0 µg/L	U
m,p-Xylene	2.0 µg/L	< 2.0 µg/L	U
o-Xylene	2.0 µg/L	< 2.0 µg/L	U
Bromofluorobenzene (SS)		51.8 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-1
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Ground Water for IRPIMS
ID MARKS : RAFB-GP3A#
: N1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 3510B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0807801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	500 µg/L	< 500 µg/L	U
Triacontane (SS)		241 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-2
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Ground Water for IRPIMS
ID MARKS : RAFB-GP9#
: N1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 3510B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0807831001

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	18.0 µg/L	< 18.0 µg/L	U
Acenaphthylene	23.0 µg/L	< 23.0 µg/L	U
Anthracene	6.60 µg/L	< 6.60 µg/L	U
Benzo(a)anthracene	0.130 µg/L	< 0.130 µg/L	U
Benzo(a)pyrene	0.120 µg/L	< 0.120 µg/L	U
Benzo(b)fluoranthene	0.180 µg/L	< 0.180 µg/L	U
Benzo(g,h,i)perylene	0.760 µg/L	< 0.760 µg/L	U
Benzo(k)fluoranthene	0.170 µg/L	< 0.170 µg/L	U
Chrysene	1.50 µg/L	< 1.50 µg/L	U
Dibenz(a,h)anthracene	0.300 µg/L	< 0.300 µg/L	U
Fluoranthene	2.10 µg/L	< 2.10 µg/L	U
Fluorene	2.10 µg/L	< 2.10 µg/L	U
Indeno(1,2,3-cd)pyrene	0.430 µg/L	< 0.430 µg/L	U
Naphthalene	18.0 µg/L	< 18.0 µg/L	U

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Inchcape Testing Services
Environmental Laboratories

REPORT NUMBER : D96-8676-2 PAGE 2
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Phenanthrene	6.40 µg/L	< 6.40 µg/L	U
Pyrene	2.70 µg/L	< 2.70 µg/L	U
1-Fluoronapthalene (SS)		196 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-2
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Ground Water for IRPIMS
ID MARKS : RAFB-GP9#
: N1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : CNA
PREPARED ON : 13-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : VHT
ANALYZED ON : 14-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0813802002

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	2.0 µg/L	< 2.0 µg/L	U
Toluene	2.0 µg/L	< 2.0 µg/L	U
Ethyl benzene	2.0 µg/L	< 2.0 µg/L	U
m,p-Xylene	2.0 µg/L	< 2.0 µg/L	U
o-Xylene	2.0 µg/L	< 2.0 µg/L	U
Bromofluorobenzene (SS)		52.4 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-2
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Ground Water for IRPIMS
ID MARKS : RAFB-GP9#
: N1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 3510B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0807801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	500 µg/L	783 µg/L	
Triacontane (SS)		236 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-3
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Ground Water for IRPIMS
ID MARKS : RAFB-RSW#
: N1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3510B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0807831001

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	18.0 µg/L	< 18.0 µg/L	U
Acenaphthylene	23.0 µg/L	< 23.0 µg/L	U
Anthracene	6.60 µg/L	< 6.60 µg/L	U
Benzo(a)anthracene	0.130 µg/L	< 0.130 µg/L	U
Benzo(a)pyrene	0.120 µg/L	< 0.120 µg/L	U
Benzo(b)fluoranthene	0.180 µg/L	< 0.180 µg/L	U
Benzo(g,h,i)perylene	0.760 µg/L	< 0.760 µg/L	U
Benzo(k)fluoranthene	0.170 µg/L	< 0.170 µg/L	U
Chrysene	1.50 µg/L	< 1.50 µg/L	U
Dibenz(a,h)anthracene	0.300 µg/L	< 0.300 µg/L	U
Fluoranthene	2.10 µg/L	< 2.10 µg/L	U
Fluorene	2.10 µg/L	< 2.10 µg/L	U
Indeno(1,2,3-cd)pyrene	0.430 µg/L	< 0.430 µg/L	U
Naphthalene	18.0 µg/L	< 18.0 µg/L	U

A1

Inchcape Testing Services
Environmental Laboratories

REPORT NUMBER : D96-8676-3
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Phenanthrene	6.40 µg/L	< 6.40 µg/L	U
Pyrene	2.70 µg/L	< 2.70 µg/L	U
1-Fluoronapthalene (SS)		195 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-3
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Ground Water for IRPIMS
ID MARKS : RAFB-RSW#
: N1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : CNA
PREPARED ON : 13-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : VHT
ANALYZED ON : 14-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0813802002

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	2.0 µg/L	< 2.0 µg/L	U
Toluene	2.0 µg/L	< 2.0 µg/L	U
Ethyl benzene	2.0 µg/L	< 2.0 µg/L	U
m,p-Xylene	2.0 µg/L	< 2.0 µg/L	U
o-Xylene	2.0 µg/L	< 2.0 µg/L	U
Bromofluorobenzene (SS)		52.2 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-3
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Ground Water for IRPIMS
ID MARKS : RAFB-RSW#
: N1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3510B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0807801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	500 µg/L	< 500 µg/L	U
Triacontane (SS)		243 µg/L	

Results are reported on Dry Weight basis.

28

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-4
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Ground Water for IRPIMS
ID MARKS : RAFB-RSS#
: N1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3510B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0807831001

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	18.0 µg/L	< 18.0 µg/L	U
Acenaphthylene	23.0 µg/L	< 23.0 µg/L	U
Anthracene	6.60 µg/L	< 6.60 µg/L	U
Benzo(a)anthracene	0.130 µg/L	< 0.130 µg/L	U
Benzo(a)pyrene	0.120 µg/L	< 0.120 µg/L	U
Benzo(b)fluoranthene	0.180 µg/L	< 0.180 µg/L	U
Benzo(g,h,i)perylene	0.760 µg/L	< 0.760 µg/L	U
Benzo(k)fluoranthene	0.170 µg/L	< 0.170 µg/L	U
Chrysene	1.50 µg/L	< 1.50 µg/L	U
Dibenz(a,h)anthracene	0.300 µg/L	< 0.300 µg/L	U
Fluoranthene	2.10 µg/L	< 2.10 µg/L	U
Fluorene	2.10 µg/L	< 2.10 µg/L	U
Indeno(1,2,3-cd)pyrene	0.430 µg/L	< 0.430 µg/L	U
Naphthalene	18.0 µg/L	< 18.0 µg/L	U

REPORT NUMBER : D96-8676-4
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Phenanthrene	6.40 µg/L	< 6.40 µg/L	U
Pyrene	2.70 µg/L	< 2.70 µg/L	U
1-Fluoronapthalene (SS)		192 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-4
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Ground Water for IRPIMS
ID MARKS : RAFB-RSS#
: N1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : CNA
PREPARED ON : 13-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : VHT
ANALYZED ON : 14-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0813802002

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	2.0 µg/L	< 2.0 µg/L	U
Toluene	2.0 µg/L	< 2.0 µg/L	U
Ethyl benzene	2.0 µg/L	< 2.0 µg/L	U
m,p-Xylene	2.0 µg/L	< 2.0 µg/L	U
o-Xylene	2.0 µg/L	< 2.0 µg/L	U
Bromofluorobenzene (SS)		52.1 µg/L	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-4
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Ground Water for IRPIMS
ID MARKS : RAFB-RSS#
: N1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3510B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0807801503

TOTAL EXTRACTABLE HYDROCARBONS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	500 µg/L	< 500 µg/L	U
Triacontane (SS)		236 µg/L	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-5
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Water Quality Control for IRPIMS
ID MARKS : LABQC#
: LB1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 3-AUG-1996
PREPARATION METHOD : EPA 3510B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0807831001

POLYNUCLEAR AROMATIC HYDROCARBONS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	18.0 µg/L	< 18.0 µg/L	U
Acenaphthylene	23.0 µg/L	< 23.0 µg/L	U
Anthracene	6.60 µg/L	< 6.60 µg/L	U
Benzo(a)anthracene	0.130 µg/L	< 0.130 µg/L	U
Benzo(a)pyrene	0.120 µg/L	< 0.120 µg/L	U
Benzo(b)fluoranthene	0.180 µg/L	< 0.180 µg/L	U
Benzo(g,h,i)perylene	0.760 µg/L	< 0.760 µg/L	U
Benzo(k)fluoranthene	0.170 µg/L	< 0.170 µg/L	U
Chrysene	1.50 µg/L	< 1.50 µg/L	U
Dibenz(a,h)anthracene	0.300 µg/L	< 0.300 µg/L	U
Fluoranthene	2.10 µg/L	< 2.10 µg/L	U
Fluorene	2.10 µg/L	< 2.10 µg/L	U
Indeno(1,2,3-cd)pyrene	0.430 µg/L	< 0.430 µg/L	U
Naphthalene	18.0 µg/L	< 18.0 µg/L	U

REPORT NUMBER : D96-8676-5
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS				
TEST REQUESTED	DETECTION LIMIT	RESULTS		FLAG
Phenanthrene	6.40 µg/L	<	6.40 µg/L	U
Pyrene	2.70 µg/L	<	2.70 µg/L	U
1-Fluoronapthalene (SS)			199 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-5
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Water Quality Control for IRPIMS
ID MARKS : LABQC#
: LB1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 3-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : CNA
PREPARED ON : 13-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : VHT
ANALYZED ON : 14-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0813802002

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	2.0 µg/L	< 2.0 µg/L	U
Toluene	2.0 µg/L	< 2.0 µg/L	U
Ethyl benzene	2.0 µg/L	< 2.0 µg/L	U
m,p-Xylene	2.0 µg/L	< 2.0 µg/L	U
o-Xylene	2.0 µg/L	< 2.0 µg/L	U
Bromofluorobenzene (SS)		52.9 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-5
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Water Quality Control for IRPIMS
ID MARKS : LABQC#
: LB1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 3-AUG-1996
PREPARATION METHOD : EPA 3510B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0807801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	500 µg/L	< 500 µg/L	U
Triacontane (SS)		236 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-6
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Water Quality Control for IRPIMS
ID MARKS : LABQC#
: BS1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 3-AUG-1996
PREPARATION METHOD : EPA 3510B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 20-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 0.1
QC BATCH NO : 0807831001

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	1.80 µg/L	3.16 µg/L	
Acenaphthylene	2.30 µg/L	4.05 µg/L	
Anthracene	0.660 µg/L	8.81 µg/L	
Benzo(a)anthracene	0.0130 µg/L	9.64 µg/L	
Benzo(a)pyrene	0.0120 µg/L	8.31 µg/L	
Benzo(b)fluoranthene	0.0180 µg/L	8.76 µg/L	
Benzo(g,h,i)perylene	0.0760 µg/L	3.97 µg/L	
Benzo(k)fluoranthene	0.0170 µg/L	7.74 µg/L	
Chrysene	0.150 µg/L	9.83 µg/L	
Dibenz(a,h)anthracene	0.0300 µg/L	3.67 µg/L	
Fluoranthene	0.210 µg/L	9.34 µg/L	
Fluorene	0.210 µg/L	9.06 µg/L	
Indeno(1,2,3-cd)pyrene	0.0430 µg/L	4.78 µg/L	
Naphthalene	1.80 µg/L	4.40 µg/L	

Inchcape Testing Services
Environmental Laboratories

REPORT NUMBER : D96-8676-6
ANALYSIS METHOD : EPA 8310 PR /1

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Phenanthrene	0.640 µg/L	8.82 µg/L	
Pyrene	0.270 µg/L	9.15 µg/L	
1-Fluoronapthalene (SS)		189 µg/L	

Results are reported on Dry Weight basis.

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Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-6
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Water Quality Control for IRPIMS
ID MARKS : LABQC#
: BS1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 3-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : CNA
PREPARED ON : 13-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : VHT
ANALYZED ON : 14-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0813802002

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	2.0 µg/L	52.7 µg/L	
Toluene	2.0 µg/L	53.0 µg/L	
Ethyl benzene	2.0 µg/L	54.2 µg/L	
m,p-Xylene	2.0 µg/L	120 µg/L	
o-Xylene	2.0 µg/L	57.3 µg/L	
Bromofluorobenzene (SS)		53.0 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-6
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Water Quality Control for IRPIMS
ID MARKS : LABQC#
: BS1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 3-AUG-1996
PREPARATION METHOD : EPA 3510B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 8-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0807801503

TOTAL EXTRACTABLE HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	500 µg/L	1980 µg/L	
Triacontane (SS)		226 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-7
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Water Quality Control for IRPIMS
ID MARKS : LABQC#
: BD1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 3-AUG-1996
PREPARATION METHOD : EPA 3510B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8015M /1
ANALYZED BY : MTW
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0807801503

TOTAL EXTRACTABLE HYDROCARBONS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Total Extractable Hydrocarbons	500 µg/L	1960 µg/L	
Triacontane (SS)		239 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-8
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Water Quality Control for IRPIMS
ID MARKS : FIELDQC#
: TB1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : CNA
PREPARED ON : 13-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : VHT
ANALYZED ON : 14-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0813802002

BTEX ANALYSIS

TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	2.0 µg/L	< 2.0 µg/L	U
Toluene	2.0 µg/L	< 2.0 µg/L	U
Ethyl benzene	2.0 µg/L	< 2.0 µg/L	U
m,p-Xylene	2.0 µg/L	< 2.0 µg/L	U
o-Xylene	2.0 µg/L	< 2.0 µg/L	U
Bromofluorobenzene (SS)		52.0 µg/L	

Results are reported on Dry Weight basis.

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-9
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Water Quality Control for IRPIMS
ID MARKS : FIELDQC#
: TB1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 2-AUG-1996
PREPARATION METHOD : EPA 5030
PREPARED BY : CNA
PREPARED ON : 13-AUG-1996
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : VHT
ANALYZED ON : 14-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0813802002

BTEX ANALYSIS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Benzene	2.0 µg/L	< 2.0 µg/L	U
Toluene	2.0 µg/L	< 2.0 µg/L	U
Ethyl benzene	2.0 µg/L	< 2.0 µg/L	U
m,p-Xylene	2.0 µg/L	< 2.0 µg/L	U
o-Xylene	2.0 µg/L	< 2.0 µg/L	U
Bromofluorobenzene (SS)		52.4 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996

REPORT NUMBER : D96-8676-10
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Ground Water for IRPIMS
ID MARKS : RAFB-RSS#
: MS1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3520B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0807831001#8676-4

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	18.0 µg/L	19.2 µg/L	
Acenaphthylene	23.0 µg/L	14.1 µg/L	J
Anthracene	6.60 µg/L	19.7 µg/L	
Benzo(k)fluoranthene	0.170 µg/L	17.0 µg/L	
Chrysene	1.50 µg/L	20.8 µg/L	
Fluoranthene	2.10 µg/L	20.2 µg/L	
Fluorene	2.10 µg/L	19.3 µg/L	
Naphthalene	18.0 µg/L	15.2 µg/L	J
Phenanthrene	6.40 µg/L	19.2 µg/L	
1-Fluoronapthalene (SS)		407 µg/L	

Results are reported on Dry Weight basis.

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 3-AUG-1996   REPORT NUMBER : D96-8676-11
REPORT DATE : 30-AUG-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Ground Water for IRPIMS
ID MARKS : RAFB-RSS#
: SD1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
PREPARATION METHOD : EPA 3520B
PREPARED BY : HCS
PREPARED ON : 7-AUG-1996
ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 9-AUG-1996
DILUTION FACTOR : 1
METHOD FACTOR : 1
QC BATCH NO : 0807831001#8676-4

POLYNUCLEAR AROMATIC HYDROCARBONS			
TEST REQUESTED	DETECTION LIMIT	RESULTS	FLAG
Acenaphthene	18.0 µg/L	18.9 µg/L	
Acenaphthylene	23.0 µg/L	14.3 µg/L	J
Anthracene	6.60 µg/L	19.7 µg/L	
Benzo(k)fluoranthene	0.170 µg/L	16.9 µg/L	
Chrysene	1.50 µg/L	20.3 µg/L	
Fluoranthene	2.10 µg/L	19.8 µg/L	
Fluorene	2.10 µg/L	18.7 µg/L	
Naphthalene	18.0 µg/L	15.6 µg/L	J
Phenanthrene	6.40 µg/L	19.1 µg/L	
1-Fluoronapthalene (SS)		406 µg/L	

Results are reported on Dry Weight basis.

QC SUMMARY

Inchcape Testing Services
Environmental Laboratories

1089 E. Collins Blvd.
Richardson, TX 75081
Tel. 214-238-5591
Fax. 214-238-5592

REPORT DATE : 27-AUG-1996 REPORT NUMBER : D96-8676

SAMPLE SUBMITTED BY : Parsons Engineering Science
ATTENTION : Mr. Steve Ratzlaff

LABORATORY QUALITY CONTROL REPORT

ANALYTE	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene
BATCH NO.	0807831001	0807831001	0807831001	0807831001	0807831001
LCS LOT NO.	AB604-83	AB604-83	AB604-83	AB604-83	AB604-83
PREP METHOD	EPA 3510B	EPA 3510B	EPA 3510B	EPA 3510B	EPA 3510B
PREPARED BY	DAW	DAW	DAW	DAW	DAW
ANALYSIS METHOD	EPA 8310 PR	EPA 8310 PR	EPA 8310 PR	EPA 8310 PR	EPA 8310 PR
ANALYZED BY	JXA	JXA	JXA	JXA	JXA
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L
METHOD BLANK	< 1.00	< 1.00	< 1.80	< 0.210	< 0.640
SPIKE LEVEL	20.0	20.0	20.0	20.0	20.0
SPK REC LIMITS	10.0 - 122	10.0 - 139	10.0 - 124	10.0 - 142	10.0 - 155
SPK RPD LIMITS	41.0	45.0	40.0	43.0	38.0
MS RESULT	9.43	9.97	8.16	20.4	20.2
MS RECOVERY %	47.2	49.9	40.8	102	101
MSD RESULT	14.0	10.2	9.34	21.2	20.7
MSD RECOVERY %	70.0	51.0	46.7	106	104
MS/MSD RPD %	39.0	2.28	13.5	3.85	2.44
BS RESULT	NA	NA	NA	NA	NA
BS RECOVERY %	NA	NA	NA	NA	NA
BSD RESULT	NA	NA	NA	NA	NA
BSD RECOVERY %	NA	NA	NA	NA	NA
BS/BSD RPD %	NA	NA	NA	NA	NA
DUP RPD LIMITS	---	---	---	---	---
DUPLICATE RPD %	NA	NA	NA	NA	NA
LCS LEVEL	10.0	10.0	10.0	10.0	10.0
LCS REC LIMITS	10.0 - 122	10.0 - 139	10.0 - 124	10.0 - 142	10.0 - 155
LCS RESULT	4.40	4.05	3.16	9.06	8.82
LCS RECOVERY %	44.0	40.5	31.6	90.6	88.2
SPIKE SAMPLE ID	8676-4	8676-4	8676-4	8676-4	8676-4
SAMPLE VALUE	< 1.00	< 1.00	< 1.80	< 0.210	< 0.640
DUP SAMPLE ID	---	---	---	---	---
DUP SAMPLE VAL/1	---	---	---	---	---
DUP SAMPLE VAL/2	---	---	---	---	---

NA Not applicable

Inchcape Testing Services
Environmental Laboratories

1089 E. Collins Blvd.
Richardson, TX 75081
Tel. 214-238-5591
Fax. 214-238-5592

REPORT DATE : 27-AUG-1996 REPORT NUMBER : D96-8676

SAMPLE SUBMITTED BY : Parsons Engineering Science
ATTENTION : Mr. Steve Ratzlaff

LABORATORY QUALITY CONTROL REPORT

ANALYTE	Anthracene	Chrysene	Benzo(k)fluoranthene	Total Petroleum Hydrocarbon
BATCH NO.	0807831001	0807831001	0807831001	0807801503
LCS LOT NO.	AB604-83	AB604-83	AB604-83	AB604-86A
PREP METHOD	EPA 3510B	EPA 3510B	EPA 3510B	EPA 3510B
PREPARED BY	DAW	DAW	DAW	HCS
ANALYSIS METHOD	EPA 8310 PR	EPA 8310 PR	EPA 8310 PR	EPA 8015M
ANALYZED BY	JXA	JXA	JXA	MTW
UNITS	µg/L	µg/L	µg/L	mg/L
METHOD BLANK	< 0.660	< 0.150	< 0.170	< 0.500
SPIKE LEVEL	20.0	20.0	20.0	2.50
SPK REC LIMITS	10.0 - 126	10.0 - 199	10.0 - 159	35.0 - 115
SPK RPD LIMITS	29.0	42.0	50.0	25.0
MS RESULT	19.4	21.1	17.4	NS
MS RECOVERY %	97.0	106	87.0	NS
MSD RESULT	19.5	20.5	17.1	NS
MSD RECOVERY %	97.5	103	85.5	NS
MS/MSD RPD %	0.51	2.88	1.74	NS
BS RESULT	NA	NA	NA	1.98
BS RECOVERY %	NA	NA	NA	79.2
BSD RESULT	NA	NA	NA	1.96
BSD RECOVERY %	NA	NA	NA	78.4
BS/BSD RPD %	NA	NA	NA	1.02
DUP RPD LIMITS	---	---	---	---
DUPLICATE RPD %	NA	NA	NA	NA
LCS LEVEL	10.0	10.0	10.0	2.50
LCS REC LIMITS	10.0 - 126	10.0 - 199	10.0 - 159	35.0 - 115
LCS RESULT	8.81	9.83	7.74	SEE_BS
LCS RECOVERY %	88.1	98.3	77.4	SEE_BS
SPIKE SAMPLE ID	8676-1	8676-4	8676-4	---
SAMPLE VALUE	< 0.660	< 0.150	< 0.170	< 0.500
DUP SAMPLE ID	---	---	---	---
DUP SAMPLE VAL/1	---	---	---	---
DUP SAMPLE VAL/2	---	---	---	---

NA Not applicable
NS Insufficient sample available for MS/MSD. BS/BSD used.
SEE_BS LCS and LCS Duplicate reported as BS and BSD.

Inchcape Testing Services
Environmental Laboratories

1089 E. Collins Blvd.
Richardson, TX 75081
Tel. 214-238-5591
Fax. 214-238-5592

REPORT DATE : 27-AUG-1996 REPORT NUMBER : D96-8676

SAMPLE SUBMITTED BY : Parsons Engineering Science
ATTENTION : Mr. Steve Ratzlaff

LABORATORY QUALITY CONTROL REPORT

ANALYTE	Benzene	Ethylbenzene	Toluene	m,p-Xylenes	o-Xylene
BATCH NO.	0813802002	0813802002	0813802002	0813802002	0813802002
LCS LOT NO.	AB709-25A	AB709-25A	AB709-25A	AB709-25A	AB709-25A
PREP METHOD	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 5030
PREPARED BY	CNA	CNA	CNA	CNA	CNA
ANALYSIS METHOD	EPA 8020 PR	EPA 8020 PR	EPA 8020 PR	EPA 8020 PR	EPA 8020 PR
ANALYZED BY	CNA	CNA	CNA	CNA	CNA
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L
METHOD BLANK	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
SPIKE LEVEL	500	500	500	1000	500
SPK REC LIMITS	75.0 - 125	75.0 - 125	75.0 - 125	75.0 - 125	75.0 - 125
SPK RPD LIMITS	20.0	20.0	20.0	20.0	20.0
MS RESULT	521	530	526	1180	549
MS RECOVERY %	104	106	105	118	110
MSD RESULT	510	512	514	1140	528
MSD RECOVERY %	102	102	103	114	106
MS/MSD RPD %	2.13	3.45	2.31	3.45	3.90
BS RESULT	NA	NA	NA	NA	NA
BS RECOVERY %	NA	NA	NA	NA	NA
BSD RESULT	NA	NA	NA	NA	NA
BSD RECOVERY %	NA	NA	NA	NA	NA
BS/BSD RPD %	NA	NA	NA	NA	NA
DUP RPD LIMITS	---	---	---	---	---
DUPLICATE RPD %	NA	NA	NA	NA	NA
LCS LEVEL	50.0	50.0	50.0	100	50.0
LCS REC LIMITS	75.0 - 125	75.0 - 125	75.0 - 125	75.0 - 125	75.0 - 125
LCS RESULT	52.7	54.2	53.0	120	57.3
LCS RECOVERY %	105	108	106	120	115
SPIKE SAMPLE ID	8867-6	8867-6	8867-6	8867-6	8867-6
SAMPLE VALUE	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
DUP SAMPLE ID	---	---	---	---	---
DUP SAMPLE VAL/1	---	---	---	---	---
DUP SAMPLE VAL/2	---	---	---	---	---

NA Not applicable

GRAIN SIZE DISTRIBUTION AND TOTAL ORGANIC CARBON ANALYTICAL RESULTS

Inchcape Testing Services
Environmental Laboratories

CUSTOMER: PARSONS ENGINEERING SCIENCE
PROJECT: 726876.65122 Building 173 RAFB

REPORT NUMBER: D96-9798
SAMPLES RECEIVED: 29-August-1996

TABLE OF CONTENTS
(D96-9798)

SDG NARRATIVE

Inchcape Testing Services
Environmental Laboratories

1089 E. Collins Blvd.
Richardson, TX 75081
Tel. 214-238-5591
Fax. 214-238-5592

ANALYTICAL REPORT

DATE RECEIVED : 29-AUG-1996
REPORT NUMBER : D96-9798
REPORT DATE : 10-SEP-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff
PROJECT : 726876.65122 Building 173 RAFB

Included in this data package are the analytical results for the sample group which you have submitted to Inchcape Testing Services for analysis. These results are representative of the samples as received by the laboratory.

The information contained herein has undergone extensive review and is deemed accurate and complete. Sample analysis and quality control were performed in accordance with all applicable protocols. Any deviations from these protocols or observations of interest are detailed in an accompanying Case Narrative. Please refrain from reproducing this report except in its entirety.

If you have any questions regarding this report and its associated materials please call your Project Manager at (214) 238-5591.

We appreciate the opportunity to serve you and look forward to providing continued service in the future.

Martin Jeffus

Martin Jeffus
General Manager

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED: 29-AUG-1996

REPORT NUMBER: D96-9798
REPORT DATE: 10-SEP-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc.
ADDRESS : 57 Executive Park, Suite #300
Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

PROJECT : 726876.65122 Building 173 RAFB

DATE SAMPLED : 1-August-1996

SDG NARRATIVE

This is a Level III data package, containing CLP-like forms for the analysis of general chemistry parameters. These analyses have been completed by U.S. Environmental Protection Agency SW846 (RCRA) and ASTM criteria.

The samples for this project were resubmitted from ITS project D96-8694.

General Chemistry Parameters

Holding Times

Samples D96-9798-1 and -2 were analyzed for gradation one day outside of the 30 day holding time.

No observations were documented for the analysis of total organic carbon.

No further observations were documented during the sample analysis for this task.

Please refer to the attached Case Narrative Summary for sample identifications and analytical requests.

Sample calculations are attached to this SDG narrative.

If there are any questions, feel free to contact Ms. Jacqueline Mayhew, at (972) 238-5591.

Alan Humason
Alan Humason
QA Coordinator

JOB ID : D96-9798
CUSTOMER : Parsons Engineering Science
PROJECT : 726876.65122 Building 173 RAFB

SAMPLE ID : D96-9798-1 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-GP4# N1#(37-39')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
GRADATION /1			KRH	1-SEP-1996	0901D42101
TOC_S /1			KPP	29-AUG-1996	0829906001

SAMPLE ID : D96-9798-2 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-GP5# N1#(36-38')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
GRADATION /1			KRH	1-SEP-1996	0901D42101
TOC_S /1			KPP	29-AUG-1996	0829906001

SAMPLE ID : D96-9798-3 DATE SAMPLED : 29-AUG-1996
ID MARKS : LABQC# LB1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
TOC_S /1			KPP	29-AUG-1996	0829906001

SAMPLE ID : D96-9798-4 DATE SAMPLED : 29-AUG-1996
ID MARKS : LABQC# BS1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
TOC_S /1			KPP	29-AUG-1996	0829906001

SAMPLE ID : D96-9798-5 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-GP4# MS1#(37-39')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
TOC_S /1			KPP	29-AUG-1996	0829906001#9798-1

JOB ID	:	D96-9798
CUSTOMER	:	Parsons Engineering Science
PROJECT	:	726876.65122 Building 173 RAFB

SAMPLE ID : D96-9798-6 DATE SAMPLED : 1-AUG-1996
ID MARKS : RAFB-GP4# SD1#(37-39')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER
TOC_S /1			KPP	29-AUG-1996	0829906001#9798-1

SAMPLE ID : D96-9798-7 DATE SAMPLED : 29-AUG-1996
ID MARKS : LABQC# LR1#(0-0')

ANALYSIS	PRP	PRP DATE	ANL	ANL DATE	QC BATCH NUMBER

ANALYSIS	DESCRIPTION
GRADATION	Gradation, Method ASTM D421/D422
TOC_S	Total Organic Carbon, Soil/Solid

GENERAL CHEMISTRY PARAMETERS

SAMPLE DATA

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 29-AUG-1996

REPORT NUMBER : D96-9798-1
REPORT DATE : 10-SEP-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP4#
: N1#(37-39')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
ANALYSIS METHOD : ASTM D421/D422 /1
ANALYZED BY : KRH
ANALYZED ON : 1-SEP-1996
QC BATCH NO : 0901D42101

GRADATION REPORT		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Gravel & Coarse Sand (> 2.00 mm)	0.1 %	< 0.1 %
Medium & Fine Sand (0.075 to 2.00 mm)	0.1 %	89.9 %
Silt (0.005 to 0.075 mm)	0.1 %	9.2 %
Clay/Colloids (< 0.005 mm)	0.1 %	1.0 %

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 29-AUG-1996

REPORT NUMBER : D96-9798-1
REPORT DATE : 10-SEP-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP4#
: N1#(37-39')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996

MISCELLANEOUS ANALYSES		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Total Organic Carbon /1	200 mg/Kg	< 200 mg/Kg

Dilution Factor : 1
Analyzed using EPA 9060 on 29-AUG-1996 by KPP
QC Batch No : 0829906001

DATE RECEIVED : 29-AUG-1996

REPORT NUMBER : D96-9798-2
REPORT DATE : 10-SEP-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(36-38')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996
ANALYSIS METHOD : ASTM D421/D422 /1
ANALYZED BY : KRH
ANALYZED ON : 1-SEP-1996
QC BATCH NO : 0901D42101

GRADATION REPORT

TEST REQUESTED	DETECTION LIMIT	RESULTS
Gravel & Coarse Sand (> 2.00 mm)	0.1 %	< 0.1 %
Medium & Fine Sand (0.075 to 2.00 mm)	0.1 %	44.9 %
Silt (0.005 to 0.075 mm)	0.1 %	39.8 %
Clay/Colloids (< 0.005 mm)	0.1 %	15.3 %

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 29-AUG-1996

REPORT NUMBER : D96-9798-2
REPORT DATE : 10-SEP-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP5#
: N1#(36-38')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996

MISCELLANEOUS ANALYSES		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Total Organic Carbon /1	200 mg/Kg	216 mg/Kg

Dilution Factor : 1
Analyzed using EPA 9060 on 29-AUG-1996 by KPP
QC Batch No : 0829906001

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 29-AUG-1996

REPORT NUMBER : D96-9798-3
REPORT DATE : 10-SEP-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS
ID MARKS : LABQC#
: LB1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 29-AUG-1996

MISCELLANEOUS ANALYSES		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Total Organic Carbon /1	200 mg/Kg	< 200 mg/Kg
Dilution Factor : 1 Analyzed using EPA 9060 on 29-AUG-1996 by KPP QC Batch No : 0829906001		

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 29-AUG-1996

REPORT NUMBER : D96-9798-4
REPORT DATE : 10-SEP-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS
ID MARKS : LABQC#
: BS1#(0-0')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 29-AUG-1996

MISCELLANEOUS ANALYSES		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Total Organic Carbon /1	200 mg/Kg	2190 mg/Kg

Dilution Factor : 1
Analyzed using EPA 9060 on 29-AUG-1996 by KPP
QC Batch No : 0829906001

DATE RECEIVED : 29-AUG-1996

REPORT NUMBER : D96-9798-5
REPORT DATE : 10-SEP-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP4#
: MS1#(37-39')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996

MISCELLANEOUS ANALYSES		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Total Organic Carbon /1	200 mg/Kg	2050 mg/Kg

Dilution Factor : 1
Analyzed using EPA 9060 on 29-AUG-1996 by KPP
QC Batch No : 0829906001#9798-1

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 29-AUG-1996

REPORT NUMBER : D96-9798-6
REPORT DATE : 10-SEP-1996

SAMPLE SUBMITTED BY : Parsons Engineering Science
ADDRESS : 57 Executive Park, Suite #300
: Atlanta, GA 30329
ATTENTION : Mr. Steve Ratzlaff

SAMPLE MATRIX : Soil for IRPIMS
ID MARKS : RAFB-GP4#
: SD1#(37-39')
PROJECT : 726876.65122 Building 173 RAFB
DATE SAMPLED : 1-AUG-1996

MISCELLANEOUS ANALYSES		
TEST REQUESTED	DETECTION LIMIT	RESULTS
Total Organic Carbon /1	200 mg/Kg	2000 mg/Kg

Dilution Factor : 1
Analyzed using EPA 9060 on 29-AUG-1996 by KPP
QC Batch No : 0829906001#9798-1

QUALITY CONTROL SUMMARY

REPORT DATE : 2-OCT-1996 REPORT NUMBER : D96-9798

SAMPLE SUBMITTED BY : Parsons Engineering Science
ATTENTION : Mr. Steve Ratzlaff

LABORATORY QUALITY CONTROL REPORT

ANALYTE	Total Organic Carbon
BATCH NO.	0829906001
LCS LOT NO.	AB277060-7
PREP METHOD	---
PREPARED BY	---
ANALYSIS METHOD	EPA 9060
ANALYZED BY	KPP
UNITS	mg/Kg
METHOD BLANK	< 200
SPIKE LEVEL	2000
MS RESULT	2050
MS RECOVERY %	103
MSD RESULT	2000
MSD RECOVERY %	100
MS/MSD RPD %	2.47
BS RESULT	2190
BS RECOVERY %	110
BSD RESULT	2240
BSD RECOVERY %	112
BS/BSD RPD %	2.26
DUPLICATE RPD %	NA
LCS LEVEL	2000
LCS RESULT	SEE_BS
LCS RECOVERY %	SEE_BS
SPIKE SAMPLE ID	9798-1
DUP SAMPLE ID	---

SEE_BS LCS and LCS Duplicate reported as BS and BSD.
NA Not applicable

PREPARATION AND ANALYSIS LOGS

INCHCAPE TESTING SERVICES - DALLAS

Analysis Date:	8/29/96	LCS Lot No.:	AB 277~~060-7~~ 083A KP	Batch Number: 0829906001
Calibration Stock ID:	AB 277064-6	Spiking Mix ID:	AB 277086 E	
Phosphoric Acid ID:	AB 277071-10	Check Weight ID:	86059	
KETAN PARIKH — Analyst	8/29/96 — Date	RSS — Reviewer	8/30/96 — Date	Chromatogram Location Reference:

SAMPLE ID	SAMPLE WEIGHT (mg)	INSTRUMENT READING/FINAL RESULT[2] (mg/Kg)	COMMENT
Check Weight (TV = 100.0)	100.0	99.9	
Calibration Check (TV = 10,000 mg/Kg)[1]	40.0	9896	98.9%
Method Blank (9798-3)	100.0	<200	11:24
LCS (TV = 2000.0 mg/Kg)	100.0	2194	109.7% 11:38
LCS Duplicate (9798-4)	100.0	2237	111.9% 12:12
MS (Sx No. = (8694-8) 9798-5)	100.0	2051	102.6% 21:20
MSD (Spk Lvl = 2000.0 mg/Kg) 9798-6	100.0	2001	100% 21:33
1. 9531-1	10.0	42387	13:59
2. -2	10.0	36750	14:28
3. -3	10.0	25807	14:43
4. -4	10.0	62661	14:59
5. -5	10.0	50653	18:32
6. -6	10.0	32184	19:32
7. -7	10.0	42237	19:41
8. -8	10.0	43994	20:16
9. (8694-8) 9798-1	100.0	<200	20:46
10. (8694-8 ~~11~~ KP) 9798-2	100.0	216.2	21:04
Calibration Check (10,000 mg/Kg)[1]	40.0 KP ~~100.0~~	9075	90.8%
Check Weight	100.0	99.8	

[1] Calibration Standards and Calibration Check must quantify within 15% of true value.

[2] Results transcribed from the chromatogram, transcriptions verified by reviewer.

RECORDING FORM
ASTM D421/D422 Particle Size Analysis (Gradation)

BEGINNING DATE: 8-31-96 SAMPLE ID: 9798-1

I. Composite Hydrometer Correction ("CHC") 0.0030

II. Sample % Dry-Solids ("%DS")
- A. Tare weight of drying dish 1.31 g
- B. Dish + Sample 6.85 g
- C. Dish + Sample After Drying 6.85 g
- RESULT [(C-A)/(B-A)] x 100 100 %

III. Uncorrected Sample Weight ("UCW")
- A. Tare Weight of Evaporating Dish — g
- B. Weight of soil + evaporating Dish — g
- RESULT (B - A) — g

IV. No. 10 Sieve Analysis ("10R")
- A. Empty Weight of Beaker — g
- B. Final weight of Beaker — g
- RESULT (B - A) 100 g

V. Hydrometer Test
- Weight Used for Hydrometer Test ("HSW") 100 g
- Initial Temperature of Sample 20 °C
- Sp. Gravity Reading at 2 minutes 1.0070
- Sp. Gravity Reading at 5 minutes 1.0060
- Sp. Gravity Reading at 15 minutes 1.0055
- Sp. Gravity Reading at 30 minutes 1.0050
- Sp. Gravity Reading at 60 minutes 1.0045
- Sp. Gravity Reading at 250 minutes 1.0040
- Sp. Gravity Reading at 1440 minutes 1.0040
- Final Temperature of Sample 20 °C

VI. No. 200 Sieve Analysis ("200R")
- A. Empty Weight of Beaker 99.68 g
- B. Final weight of Beaker 189.53 g
- RESULT (B - A) 89.85 g

HYDROMETER TEST

PARTICLE SIZE	PERCENT SUSPENDED
≤ 0.036 mm	4.0
≤ 0.023 mm	3.0
≤ 0.013 mm	2.5
≤ 0.009 mm	2.0
≤ 0.007 mm	1.5
≤ 0.003 mm	1.0
≤ 0.001 mm	1.0

GRADATION REPORT

PARTICLE SIZE	PERCENT IN SAMPLE	
Gravel & Coarse Sand (larger than 2.00 mm)	<0.1	
Medium & Fine Sand (0.075 to 2.00 mm)	89.85	Rpd = 1.67
Silt (0.005 to 0.075 mm)	9.15	= 15.1
Clay/Colloids (smaller than 0.005 mm)	1.0	= 0

RECORDING FORM

ASTM D421/D422 Particle Size Analysis (Gradation)

BEGINNING DATE: 8-31-96 SAMPLE ID: 9798-1 Dup

I.	Composite Hydrometer Correction ("CHC")	0.0030
II.	Sample % Dry-Solids ("%DS")	
	A. Tare weight of drying dish	1.30 g
	B. Dish + Sample	6.76 g
	C. Dish + Sample After Drying	6.76 g
	RESULT [(C-A)/(B-A)] x 100	100 %
III.	Uncorrected Sample Weight ("UCW")	
	A. Tare Weight of Evaporating Dish	— g
	B. Weight of soil + evaporating Dish	— g
	RESULT (B - A)	— g
IV.	No. 10 Sieve Analysis ("10R")	
	A. Empty Weight of Beaker	— g
	B. Final weight of Beaker	— g
	RESULT (B - A)	100 g
V.	Hydrometer Test	
	Weight Used for Hydrometer Test ("HSW")	100 g
	Initial Temperature of Sample	20 °C
	Sp. Gravity Reading at 2 minutes	1.0065
	Sp. Gravity Reading at 5 minutes	1.0060
	Sp. Gravity Reading at 15 minutes	1.0055
	Sp. Gravity Reading at 30 minutes	1.0050
	Sp. Gravity Reading at 60 minutes	1.0045
	Sp. Gravity Reading at 250 minutes	1.0040
	Sp. Gravity Reading at 1440 minutes	1.0040
	Final Temperature of Sample	20 °C
VI.	No. 200 Sieve Analysis ("200R")	
	A. Empty Weight of Beaker	102.49 g
	B. Final weight of Beaker	190.85 g
	RESULT (B - A)	88.36 g

HYDROMETER TEST

PARTICLE SIZE	PERCENT SUSPENDED
≤ 0.037 mm	3.5
≤ 0.023 mm	3.0
≤ 0.013 mm	2.5
≤ 0.009 mm	2.0
≤ 0.007 mm	1.5
≤ 0.003 mm	1.0
≤ 0.001 mm	1.0

GRADATION REPORT

PARTICLE SIZE	PERCENT IN SAMPLE
Gravel & Coarse Sand (larger than 2.00 mm)	<0.1
Medium & Fine Sand (0.075 to 2.00 mm)	88.36
Silt (0.005 to 0.075 mm)	10.64
Clay/Colloids (smaller than 0.005 mm)	1.0

RECORDING FORM
ASTM D421/D422 Particle Size Analysis (Gradation)

BEGINNING DATE: 8-31-96 SAMPLE ID: 9798-2

I. Composite Hydrometer Correction ("CHC") 0.0030

II. Sample % Dry-Solids ("%DS")
A. Tare weight of drying dish 1.32 g
B. Dish + Sample 6.79 g
C. Dish + Sample After Drying 6.68 g
RESULT [(C-A)/(B-A)] x 100 97.9 %

III. Uncorrected Sample Weight ("UCW")
A. Tare Weight of Evaporating Dish — g
B. Weight of soil + evaporating Dish — g
RESULT (B - A) — g

IV. No. 10 Sieve Analysis ("10R")
A. Empty Weight of Beaker — g
B. Final weight of Beaker — g
RESULT (B - A) 100 g

V. Hydrometer Test
Weight Used for Hydrometer Test ("HSW") 100 g
Initial Temperature of Sample 20°C
Sp. Gravity Reading at 2 minutes 1.0250
Sp. Gravity Reading at 5 minutes 1.0225
Sp. Gravity Reading at 15 minutes 1.0210
Sp. Gravity Reading at 30 minutes 1.0200
Sp. Gravity Reading at 60 minutes 1.0190
Sp. Gravity Reading at 250 minutes 1.0180
Sp. Gravity Reading at 1440 minutes 1.0170
Final Temperature of Sample 20°C

VI. No. 200 Sieve Analysis ("200R")
A. Empty Weight of Beaker 104.97 g
B. Final weight of Beaker 148.94 g
RESULT (B - A) 43.97 g

HYDROMETER TEST

PARTICLE SIZE	PERCENT SUSPENDED
≤ 0.030 mm	22.47
≤ 0.019 mm	19.91
≤ 0.011 mm	18.38
≤ 0.008 mm	17.36
≤ 0.006 mm	16.34
≤ 0.003 mm	15.32
≤ 0.001 mm	14.3

GRADATION REPORT

PARTICLE SIZE	PERCENT IN SAMPLE
Gravel & Coarse Sand (larger than 2.00 mm)	<0.1
Medium & Fine Sand (0.075 to 2.00 mm)	44.9
Silt (0.005 to 0.075 mm)	39.78
Clay/Colloids (smaller than 0.005 mm)	15.32

CHAINS OF CUSTODY, SHIPPING DOCUMENTS, INVENTORY SHEETS

Report to:	Invoice to	ANALYSIS REQUESTED	Lab use only
Company: Parsons	Company:	TOC 9060	Due Date:
Address: Atlanta	Address:	Grainsize	Temp. of coolers when received (C°): 1 2 3 4 5
Contact: Steve Ratzlaff	Contact:		Custody Seal N / Y
Phone:	Phone:		Intact N / Y
Fax:	PO/SO #: PD60345		Screened For Radioactivity ☐
Sampler's Name	Sampler's Signature		

Proj. No.: 726876.65122 Project Name: Building 173 RAFB

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	VOA	A/G 1 Lt.	250 ml	P/O	TOC 9060	Grainsize	Lab Sample ID (Lab Use Only)
SO	8/1/96				RAFB-GP4# NI # (37-39') Resubmitted from 8694-8					X	X	9798-1 3500
SO	8/1/96				RAFB-GP5# NI # (36-38') Resubmitted from 8694-11					X	X	2
												3
					LB1							4
					BS1							5
	8/1				MS1 RAFB-GP4 (37-39')							6
	↓				SD1 ↓ LR1							7

Turn around time ☐ Priority 1 or Standard ☐ Priority 2 or 50% ☐ Priority 3 or 100% ☐ Priority 4 ERS * | * BTEX (602/8020), TPH (418.1 or 8015), VOLATILES (624/8240), IGNITABILITY, TOTAL LEAD (6010)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:	Remarks
			Sarah May	8/30/96	PM	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:	Client's delivery of samples constitutes acceptance of Inchcape/ITS-Dallas terms and conditions contained in the Price Schedule.

[1] Matrix WW - Wastewater W - Water S - Soil SD - Solid L - Liquid A - Air Bag C - Charcoal tube SL - Sludge O - Oil

[2] Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other

Inchcape cannot accept verbal changes. Please Fax written changes to 214-238-5592

OFFICE USE ONLY

ORIGINAL

Inchcape Testing Services Environmental Laboratories 1089 East Collins Blvd., #100 Richardson, TX 75081 (214) 238-5591

CHAIN OF CUSTODY RECORD

Report to:		Invoice to	
Company:	Parsons ES	Company:	SAME
Address:	Atlanta	Address:	
Contact:		Contact:	
Phone:		Phone:	
Fax:		PO/SO #:	

Sampler's Name: Greg Hedrick Sampler's Signature: [signature]

Lab use only
Due Date:
Temp. of coolers when received (C°): 1: 4 | 2: | 3: | 4: | 5:
Custody Seal N / Y (Y circled)
Intact N / Y
Screened For Radioactivity ☒

Proj. No.: 726876
Project Name: 65122 Building 173 Robins AFB

ANALYSIS REQUESTED: BTEX 8020; PAH 8310; TPH-DRO 8015

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	VOA	A/G 1 Lt.	250 ml	P/O	BTEX 8020	PAH 8310	TPH-DRO 8015	Lab Sample ID (Lab Use Only)
S	7/31	1600		X	073196-RAFB-GP1-14-16'				2				8694-1
		1645			073196-RAFB-GP1-36-38'				2				2
		1820			073196-RAFB-GP2-6-8'				2				3
		1900			073196-RAFB-GP2-34-36'				2				4
	8/1	1015			080196-RAFB-GP3-8-10'				2				5
		1100			080196-RAFB-GP3-42-44'				2				6
		1405			080196-RAFB-GP4-8-10'				2				7
		1505			080196-RAFB-GP4-37-39'				2				8
		1650			080196-RAFB-GP5-14-16'				2				9
		1715			080196-RAFB-GP5-23-25'				2				10

Turn around time ☒ Priority 1 or Standard ☐ Priority 2 or 50% ☐ Priority 3 or 100% ☐ Priority 4 ERS *

* BTEX (602/8020), TPH (418.1 or 8015), VOLATILES (624/8240), IGNITABILITY, TOTAL LEAD (6010)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	8/2	1445	[signature]	8/3/96	1000

Remarks:

Client's delivery of samples constitutes acceptance of Inchcape/ITS-Dallas terms and conditions contained in the Price Schedule.

[1] Matrix: WW - Wastewater; W - Water; S - Soil; SD - Solid; L - Liquid; A - Air Bag; C - Charcoal tube; SL - Sludge; O - Oil
[2] Container: VOA - 40 ml vial; A/G - Amber / Or Glass 1 Liter; 250 ml - Glass wide mouth; P/O - Plastic or other

Inchcape cannot accept verbal changes. Please Fax written changes to 214-238-5592

OFFICE USE ONLY

Inchcape Testing Services [redacted] Dalla[redacted] Eas[redacted]ns Bl[redacted]char[redacted]TX 7[redacted](214[redacted]5591[redacted] CH[redacted]OF [redacted]TOD[redacted]ECO[redacted]

Report to:
Company: Parsons ES
Address: Atlanta
Contact: Steve Ratzlaff
Phone:
Fax:

Invoice to
Company: Same
Address:
Contact:
Phone:
PO/SO #:

Sampler's Name: Greg Hedrick
Sampler's Signature: Greg Hedrick

ANALYSIS REQUESTED: BTEX 8020; PAH 8310; TPH-DRO 8015

Lab use only
Due Date:
Temp. of coolers when received (C°): 1: 4 | 2: | 3: | 4: | 5:
Custody Seal N/Y (Y circled)
Intact N/Y (Y circled)
Screened For Radioactivity ☒

Proj. No.:
Project Name:

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	VOA	A/G 1 Lt.	250 ml	P/O	Lab Sample ID (Lab Use Only)
S	8/1	1740		X	080196-RAFB-GP5-36-38'				2	8694-11
↓	8/2	0800		↓	080296-RAFB-GP6-14-16'				2	12
		0850			080296-RAFB-GP6-35-37'				2	13
		1145			080296-RAFB-GP7-20-22'				2	14
		1200			080296-RAFB-GP7-30-32'				2	15
	↓	1220			080296-RAFB-GP7-36-38'				2	16
					Method Blank LB1					17
					BS1					18
					BD1					19
					~~073196-RAFB-GP1 MS1 14-16'~~		Not Required			20
					073196-RAFB-GP1 SD1 14-16'					21

Turn around time: ☒ Priority 1 or Standard ☐ Priority 2 or 50% ☐ Priority 3 or 100% ☐ Priority 4 ERS •

• BTEX (602/8020), TPH (418.1 or 8015), VOLATILES (624/8240), IGNITABILITY, TOTAL LEAD (6010)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Greg Hedrick	8/2	1445	Dave [illegible]	8/3/96	1000

Remarks:

Client's delivery of samples constitutes acceptance of Inchcape/ITS-Dallas terms and conditions contained in the Price Schedule.

[1] Matrix: WW - Wastewater, W - Water, S - Soil, SD - Solid, L - Liquid, A - Air Bag, C - Charcoal tube, SL - Sludge, O - Oil
[2] Container: VOA - 40 ml vial, A/G - Amber / Or Glass 1 Liter, 250 ml - Glass wide mouth, P/O - Plastic or other

ITS - Dallas cannot accept verbal changes. Please Fax written changes to 214-238-5592

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APPENDIX D
CALCULATION OF ALTERNATE THRESHOLD LEVELS

Alternate Threshold Calculation for Ethylbenzene
Building 173 Former Diesel UST Site
Robins AFB, Georgia

Equation Set I - Determine Soil Pore Water Concentration Resulting from Physical Partitioning

Step 1:

Total Petroleum Hydrocarbons Concentration in Soil (GP4 8-10'): $TPH := 615 \cdot \frac{mg}{kg}$

Background Total Organic Carbon Concentration in Soil: $TOC := 158 \cdot \frac{mg}{kg}$

Fraction of Organic Carbon Content (f_{cs}) of the Contaminated Soil

$$f_{cs} := \left(TOC + \frac{TPH}{1.724}\right) \qquad f_{cs} = 5.147 \cdot 10^{-4}$$

Step 2:

Contaminant Concentration in Soil (GP4 8-10'): $C_s := 0.8 \cdot \frac{mg}{kg}$

Soil/Water Partitioning Coefficient (USEPA, 1990): $K_{oc} := 1100 \cdot \frac{ml}{gm}$

Contaminant Concentration in Pore Water (C_w):

$$C_w := \frac{C_s}{K_{oc} \cdot f_{cs}} \qquad C_w = 1.413 \cdot 10^3 \cdot \frac{ug}{liter}$$

Equation Set II - Determine the Velocity of the Soil Pore Water

Step 1:

Total Porosity of Soil (GA EPD, 1996): $n := 0.52 \cdot \frac{cm^3}{cm^3}$

Residual Water Content (GA EPD, 1996): $\theta_r := 0.08 \cdot \frac{cm^3}{cm^3}$

Calculate the Air-filled Porosity (f): $f := n - \theta_r \qquad f = 0.44 \cdot \frac{cm^3}{cm^3}$

Step 2:

Unsaturated Hydraulic Conductivity (GA EPD, 1996): $K := 0.007 \cdot \frac{cm}{hr}$

Thickness of Clay Layer beneath Contaminated Soil: $L := 7 \cdot ft$

Average Annual Recharge (estimate): $H_w := 8 \cdot in$

Wetting Front Suction (GA EPD, 1996): $h_{cr} := -140 \cdot cm$

Duration for percolation to Water Table (t):

$$t := \frac{f}{K} \cdot \left[L - \left(H_w - h_{cr}\right) \cdot \ln\left(\frac{H_w + L - h_{cr}}{H_w - h_{cr}}\right)\right] \qquad t = 203.481 \cdot day$$

Equation Set II (continued)

Step 3:

Pore Water Velocity: $V_w := \frac{L}{t}$ $V_w = 12.565 \cdot \frac{ft}{yr}$

Equation Set III - Determine the Organic Retardation Effect

Step 1:

Calculate Soil/Water Distribution Coefficient: $K_d := K_{oc} \cdot TOC$ $K_d = 0.174 \cdot \frac{ml}{gm}$

Step 2:

Soil Bulk Density (GA EPD, 1996): $\rho_b := 1.48 \cdot \frac{gm}{cm^3}$

Calculate Retardation Effect on Contaminant Migration:

$$V_c := \frac{V_w}{1 + \frac{\rho_b \cdot K_d}{n}} \qquad V_c = 8.406 \cdot \frac{ft}{yr}$$

Equation Set IV - Determine Biodegradation Rate and Calculate Final Predicted Contaminant Concentration in Groundwater

Step 1:

Time for Contaminant to Reach Groundwater: $T_c := \frac{L}{V_c}$ $T_c = 0.833 \cdot yr$

Step 2:

Contaminant Half-Life in Soil (GA EPD, 1996): $t_{halflife} := 10 \cdot day$

Final Groundwater Concentration (dilution effects not considered):

$$C_f := C_w \cdot e^{-\left(\frac{0.693}{t_{halflife}}\right) \cdot T_c} \qquad C_f = 9.924 \cdot 10^{-7} \cdot \frac{ug}{liter}$$

Equation Set V - Determine Allowable Alternate Threshold Level of the Contaminant in Soil

Step 1:

Applicable Water Quality Standard (GA EPD, 1994): $C_{std} := 700 \cdot \frac{ug}{liter}$

Calculate Alternate Threshold Level (C_{ATL}):

$$C_{ATL} := \frac{C_{std} \cdot f_{cs} \cdot K_{oc}}{e^{-\left(\frac{0.693}{t_{halflife}}\right) \cdot T_c}} \qquad C_{ATL} = 5.643 \cdot 10^{8} \cdot \frac{mg}{kg}$$

Alternate Threshold Calculation for Benzo(a)pyrene
Building 173 Former Diesel UST Site
Robins AFB, Georgia

Equation Set I - Determine Soil Pore Water Concentration Resulting from Physical Partitioning

Step 1:

Total Petroleum Hydrocarbons Concentration in Soil (GP5 14-16'): $TPH := 74.9 \cdot \frac{mg}{kg}$

Background Total Organic Carbon Concentration in Soil: $TOC := 158 \cdot \frac{mg}{kg}$

Fraction of Organic Carbon Content (f_{cs}) of the Contaminated Soil

$$f_{cs} := \left(TOC + \frac{TPH}{1.724}\right) \qquad f_{cs} = 2.014 \cdot 10^{-4}$$

Step 2:

Contaminant Concentration in Soil (GP5 14-16'): $C_s := 1.06 \cdot \frac{mg}{kg}$

Soil/Water Partitioning Coefficient (USEPA, 1990): $K_{oc} := 5500000 \cdot \frac{ml}{gm}$

Contaminant Concentration in Pore Water (C_w):

$$C_w := \frac{C_s}{K_{oc} \cdot f_{cs}} \qquad C_w = 0.957 \cdot \frac{ug}{liter}$$

Equation Set II - Determine the Velocity of the Soil Pore Water

Step 1:

Total Porosity of Soil (GA EPD, 1996): $n := 0.52 \cdot \frac{cm^3}{cm^3}$

Residual Water Content (GA EPD, 1996): $\theta_r := 0.08 \cdot \frac{cm^3}{cm^3}$

Calculate the Air-filled Porosity (f): $f := n - \theta_r \qquad f = 0.44 \cdot \frac{cm^3}{cm^3}$

Step 2:

Unsaturated Hydraulic Conductivity (GA EPD, 1996): $K := 0.007 \cdot \frac{cm}{hr}$

Thickness of Clay Layer beneath Contaminated Soil: $L := 7 \cdot ft$

Average Annual Recharge (estimate): $H_w := 8 \cdot in$

Wetting Front Suction (GA EPD, 1996): $h_{cr} := -140 \cdot cm$

Duration for percolation to Water Table (t):

$$t := \frac{f}{K} \cdot \left[L - \left(H_w - h_{cr}\right) \cdot \ln\left(\frac{H_w + L - h_{cr}}{H_w - h_{cr}}\right)\right] \qquad t = 203.481 \cdot day$$

Equation Set II (continued)

Step 3:

Pore Water Velocity: $V_w := \frac{L}{t}$ $\quad V_w = 12.565 \cdot \frac{ft}{yr}$

Equation Set III - Determine the Organic Retardation Effect

Step 1:

Calculate Soil/Water Distribution Coefficient: $K_d := K_{oc} \cdot TOC$ $\quad K_d = 869 \cdot \frac{ml}{gm}$

Step 2:

Soil Bulk Density (GA EPD, 1996): $\rho_b := 1.48 \cdot \frac{gm}{cm^3}$

Calculate Retardation Effect on Contaminant Migration:

$$V_c := \frac{V_w}{1 + \frac{\rho_b \cdot K_d}{n}} \qquad V_c = 0.005 \cdot \frac{ft}{yr}$$

Equation Set IV - Determine Biodegradation Rate and Calculate Final Predicted Contaminant Concentration in Groundwater

Step 1:

Time for Contaminant to Reach Groundwater: $T_c := \frac{L}{V_c}$ $\quad T_c = 1.378 \cdot 10^3 \cdot yr$

Step 2:

Contaminant Half-Life in Soil (GA EPD, 1996): $t_{halflife} := 529 \cdot day$

Final Groundwater Concentration (dilution effects not considered):

$$C_f := C_w \cdot e^{-\left(\frac{0.693}{t_{halflife}}\right) \cdot T_c} \qquad C_f = 0 \cdot \frac{ug}{liter}$$

Equation Set V - Determine Allowable Alternate Threshold Level of the Contaminant in Soil

Step 1:

Applicable Water Quality Standard (GA EPD, 1994): $C_{std} := 0.2 \cdot \frac{ug}{liter}$

Calculate Alternate Threshold Level (C_{ATL}):

$$C_{ATL} := \frac{C_{std} \cdot f_{cs} \cdot K_{oc}}{e^{-\left(\frac{0.693}{t_{halflife}}\right) \cdot T_c}} \qquad C_{ATL} = 6.156 \cdot 10^{285} \cdot \frac{mg}{kg}$$

Alternate Threshold Calculation for Benzo(b)fluoranthene
Building 173 Former Diesel UST Site
Robins AFB, Georgia

Equation Set I - Determine Soil Pore Water Concentration Resulting from Physical Partitioning

Step 1:

Total Petroleum Hydrocarbons Concentration in Soil (GP5 14-16'): $TPH := 74.9 \cdot \frac{mg}{kg}$

Background Total Organic Carbon Concentration in Soil: $TOC := 158 \cdot \frac{mg}{kg}$

Fraction of Organic Carbon Content (f_{cs}) of the Contaminated Soil

$$f_{cs} := \left(TOC + \frac{TPH}{1.724}\right) \qquad f_{cs} = 2.014 \cdot 10^{-4}$$

Step 2:

Contaminant Concentration in Soil (GP5 14-16'): $C_s := 1.14 \cdot \frac{mg}{kg}$

Soil/Water Partitioning Coefficient (USEPA, 1990): $K_{oc} := 550000 \cdot \frac{ml}{gm}$

Contaminant Concentration in Pore Water (C_w):

$$C_w := \frac{C_s}{K_{oc} \cdot f_{cs}} \qquad C_w = 10.289 \cdot \frac{ug}{liter}$$

Equation Set II - Determine the Velocity of the Soil Pore Water

Step 1:

Total Porosity of Soil (GA EPD, 1996): $n := 0.52 \cdot \frac{cm^3}{cm^3}$

Residual Water Content (GA EPD, 1996): $\theta_r := 0.08 \cdot \frac{cm^3}{cm^3}$

Calculate the Air-filled Porosity (f): $f := n - \theta_r \qquad f = 0.44 \cdot \frac{cm^3}{cm^3}$

Step 2:

Unsaturated Hydraulic Conductivity (GA EPD, 1996): $K := 0.007 \cdot \frac{cm}{hr}$

Thickness of Clay Layer beneath Contaminated Soil: $L := 7 \cdot ft$

Average Annual Recharge (estimate): $H_w := 8 \cdot in$

Wetting Front Suction (GA EPD, 1996): $h_{cr} := -140 \cdot cm$

Duration for percolation to Water Table (t):

$$t := \frac{f}{K} \cdot \left[L - \left(H_w - h_{cr}\right) \cdot \ln\left(\frac{H_w + L - h_{cr}}{H_w - h_{cr}}\right)\right] \qquad t = 203.481 \cdot day$$

Equation Set II (continued)

Step 3:

Pore Water Velocity: $V_w := \frac{L}{t}$ $V_w = 12.565 \cdot \frac{ft}{yr}$

Equation Set III - Determine the Organic Retardation Effect

Step 1:

Calculate Soil/Water Distribution Coefficient: $K_d := K_{oc} \cdot TOC$ $K_d = 86.9 \cdot \frac{ml}{gm}$

Step 2:

Soil Bulk Density (GA EPD, 1996): $\rho_b := 1.48 \cdot \frac{gm}{cm^3}$

Calculate Retardation Effect on Contaminant Migration:

$$V_c := \frac{V_w}{1 + \frac{\rho_b \cdot K_d}{n}} \qquad V_c = 0.051 \cdot \frac{ft}{yr}$$

Equation Set IV - Determine Biodegradation Rate and Calculate Final Predicted Contaminant Concentration in Groundwater

Step 1:

Time for Contaminant to Reach Groundwater: $T_c := \frac{L}{V_c}$ $T_c = 138.348 \cdot yr$

Step 2:

Contaminant Half-Life in Soil (GA EPD, 1996): $t_{halflife} := 610 \cdot day$

Final Groundwater Concentration (dilution effects not considered):

$$C_f := C_w \cdot e^{-\left(\frac{0.693}{t_{halflife}}\right) \cdot T_c} \qquad C_f = 0 \cdot \frac{ug}{liter}$$

Equation Set V - Determine Allowable Alternate Threshold Level of the Contaminant in Soil

Step 1:

Applicable Water Quality Standard (GA EPD, 1994): $C_{std} := 0.0311 \cdot \frac{ug}{liter}$

Calculate Alternate Threshold Level (C_{ATL}):

$$C_{ATL} := \frac{C_{std} \cdot f_{cs} \cdot K_{oc}}{e^{-\left(\frac{0.693}{t_{halflife}}\right) \cdot T_c}} \qquad C_{ATL} = 2.94 \cdot 10^{22} \cdot \frac{mg}{kg}$$

Alternate Threshold Calculation for Chrysene
Building 173 Former Diesel UST Site
Robins AFB, Georgia

Equation Set I - Determine Soil Pore Water Concentration Resulting from Physical Partitioning

Step 1:

Total Petroleum Hydrocarbons Concentration in Soil (GP5 14-16'): $TPH := 74.9 \cdot \frac{mg}{kg}$

Background Total Organic Carbon Concentration in Soil: $TOC := 158 \cdot \frac{mg}{kg}$

Fraction of Organic Carbon Content (f_{cs}) of the Contaminated Soil

$$f_{cs} := \left(TOC + \frac{TPH}{1.724}\right) \qquad f_{cs} = 2.014 \cdot 10^{-4}$$

Step 2:

Contaminant Concentration in Soil (GP5 14-16'): $C_s := 0.677 \cdot \frac{mg}{kg}$

Soil/Water Partitioning Coefficient (USEPA, 1990): $K_{oc} := 200000 \cdot \frac{ml}{gm}$

Contaminant Concentration in Pore Water (C_w):

$$C_w := \frac{C_s}{K_{oc} \cdot f_{cs}} \qquad C_w = 16.804 \cdot \frac{ug}{liter}$$

Equation Set II - Determine the Velocity of the Soil Pore Water

Step 1:

Total Porosity of Soil (GA EPD, 1996): $n := 0.52 \cdot \frac{cm^3}{cm^3}$

Residual Water Content (GA EPD, 1996): $\theta_r := 0.08 \cdot \frac{cm^3}{cm^3}$

Calculate the Air-filled Porosity (f): $f := n - \theta_r \qquad f = 0.44 \cdot \frac{cm^3}{cm^3}$

Step 2:

Unsaturated Hydraulic Conductivity (GA EPD, 1996): $K := 0.007 \cdot \frac{cm}{hr}$

Thickness of Clay Layer beneath Contaminated Soil: $L := 7 \cdot ft$

Average Annual Recharge (estimate): $H_w := 8 \cdot in$

Wetting Front Suction (GA EPD, 1996): $h_{cr} := -140 \cdot cm$

Duration for percolation to Water Table (t):

$$t := \frac{f}{K} \cdot \left[L - \left(H_w - h_{cr}\right) \cdot \ln\left(\frac{H_w + L - h_{cr}}{H_w - h_{cr}}\right)\right] \qquad t = 203.481 \cdot day$$

Equation Set II (continued)

Step 3:

Pore Water Velocity: $V_w := \frac{L}{t}$ $\quad V_w = 12.565 \cdot \frac{ft}{yr}$

Equation Set III - Determine the Organic Retardation Effect

Step 1:

Calculate Soil/Water Distribution Coefficient: $K_d := K_{oc} \cdot TOC$ $\quad K_d = 31.6 \cdot \frac{ml}{gm}$

Step 2:

Soil Bulk Density (GA EPD, 1996): $\rho_b := 1.48 \cdot \frac{gm}{cm^3}$

Calculate Retardation Effect on Contaminant Migration:

$$V_c := \frac{V_w}{1 + \frac{\rho_b \cdot K_d}{n}} \qquad V_c = 0.138 \cdot \frac{ft}{yr}$$

Equation Set IV - Determine Biodegradation Rate and Calculate Final Predicted Contaminant Concentration in Groundwater

Step 1:

Time for Contaminant to Reach Groundwater: $T_c := \frac{L}{V_c}$ $\quad T_c = 50.663 \cdot yr$

Step 2:

Contaminant Half-Life in Soil (GA EPD, 1996): $t_{halflife} := 829 \cdot day$

Final Groundwater Concentration (dilution effects not considered):

$$C_f := C_w \cdot e^{-\left(\frac{0.693}{t_{halflife}}\right) \cdot T_c} \qquad C_f = 3.217 \cdot 10^{-6} \cdot \frac{ug}{liter}$$

Equation Set V - Determine Allowable Alternate Threshold Level of the Contaminant in Soil

Step 1:

Applicable Water Quality Standard (GA EPD, 1994): $C_{std} := 0.0311 \cdot \frac{ug}{liter}$

Calculate Alternate Threshold Level (C_{ATL}):

$$C_{ATL} := \frac{C_{std} \cdot f_{cs} \cdot K_{oc}}{e^{-\left(\frac{0.693}{t_{halflife}}\right) \cdot T_c}} \qquad C_{ATL} = 6.544 \cdot 10^3 \cdot \frac{mg}{kg}$$

Alternate Threshold Calculation for Indeno(1,2,3-cd)pyrene
Building 173 Former Diesel UST Site
Robins AFB, Georgia

Equation Set I - Determine Soil Pore Water Concentration Resulting from Physical Partitioning

Step 1:

Total Petroleum Hydrocarbons Concentration in Soil (GP5 14-16'): $TPH := 74.9 \cdot \frac{mg}{kg}$

Background Total Organic Carbon Concentration in Soil: $TOC := 158 \cdot \frac{mg}{kg}$

Fraction of Organic Carbon Content (f_{cs}) of the Contaminated Soil

$$f_{cs} := \left(TOC + \frac{TPH}{1.724}\right) \qquad f_{cs} = 2.014 \cdot 10^{-4}$$

Step 2:

Contaminant Concentration in Soil (GP5 14-16'): $C_s := 0.936 \cdot \frac{mg}{kg}$

Soil/Water Partitioning Coefficient (USEPA, 1990): $K_{oc} := 1600000 \cdot \frac{ml}{gm}$

Contaminant Concentration in Pore Water (C_w):

$$C_w := \frac{C_s}{K_{oc} \cdot f_{cs}} \qquad C_w = 2.904 \cdot \frac{ug}{liter}$$

Equation Set II - Determine the Velocity of the Soil Pore Water

Step 1:

Total Porosity of Soil (GA EPD, 1996): $n := 0.52 \cdot \frac{cm^3}{cm^3}$

Residual Water Content (GA EPD, 1996): $\theta_r := 0.08 \cdot \frac{cm^3}{cm^3}$

Calculate the Air-filled Porosity (f): $f := n - \theta_r \qquad f = 0.44 \cdot \frac{cm^3}{cm^3}$

Step 2:

Unsaturated Hydraulic Conductivity (GA EPD, 1996): $K := 0.007 \cdot \frac{cm}{hr}$

Thickness of Clay Layer beneath Contaminated Soil: $L := 7 \cdot ft$

Average Annual Recharge (estimate): $H_w := 8 \cdot in$

Wetting Front Suction (GA EPD, 1996): $h_{cr} := -140 \cdot cm$

Duration for percolation to Water Table (t):

$$t := \frac{f}{K} \cdot \left[L - \left(H_w - h_{cr}\right) \cdot \ln\left(\frac{H_w + L - h_{cr}}{H_w - h_{cr}}\right)\right] \qquad t = 203.481 \cdot day$$

Equation Set II (continued)

Step 3:

Pore Water Velocity: $V_w := \frac{L}{t}$ $\quad V_w = 12.565 \cdot \frac{ft}{yr}$

Equation Set III - Determine the Organic Retardation Effect

Step 1:

Calculate Soil/Water Distribution Coefficient: $K_d := K_{oc} \cdot TOC$ $\quad K_d = 252.8 \cdot \frac{ml}{gm}$

Step 2:

Soil Bulk Density (GA EPD, 1996): $\rho_b := 1.48 \cdot \frac{gm}{cm^3}$

Calculate Retardation Effect on Contaminant Migration:

$$V_c := \frac{V_w}{1 + \frac{\rho_b \cdot K_d}{n}} \qquad V_c = 0.017 \cdot \frac{ft}{yr}$$

Equation Set IV - Determine Biodegradation Rate and Calculate Final Predicted Contaminant Concentration in Groundwater

Step 1:

Time for Contaminant to Reach Groundwater: $T_c := \frac{L}{V_c}$ $\quad T_c = 401.404 \cdot yr$

Step 2:

Contaminant Half-Life in Soil (GA EPD, 1996): $t_{halflife} := 730 \cdot day$

Final Groundwater Concentration (dilution effects not considered):

$$C_f := C_w \cdot e^{-\left(\frac{0.693}{t_{halflife}}\right) \cdot T_c} \qquad C_f = 0 \cdot \frac{ug}{liter}$$

Equation Set V - Determine Allowable Alternate Threshold Level of the Contaminant in Soil

Step 1:

Applicable Water Quality Standard (GA EPD, 1994): $C_{std} := 0.0311 \cdot \frac{ug}{liter}$

Calculate Alternate Threshold Level (C_{ATL}):

$$C_{ATL} := \frac{C_{std} \cdot f_{cs} \cdot K_{oc}}{e^{-\left(\frac{0.693}{t_{halflife}}\right) \cdot T_c}} \qquad C_{ATL} = 2.79 \cdot 10^{58} \cdot \frac{mg}{kg}$$

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